# U.S. ELECTRONIC DATA INTERCHANGE SERVICES, 1987 - 1992

INPUT

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# U.S. ELECTRONIC DATA INTERCHANGE SERVICES, 1987-1992

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**Electronic Data Interchange Planning Service (EDIPS)**

***U.S. Electronic Data Interchange Services, 1987-1992***

# U.S. ELECTRONIC DATA INTERCHANGE SERVICES
# 1987-1992

## ABSTRACT

Electronic Data Interchange (EDI) is the electronic transfer of standard business transaction information between organizations in a structured application. The trading partners may have different processors and data formats, in which cash translation between common formats or standards is required.

EDI offers economies by reducing manual document preparation costs and by eliminating errors caused by rekeying information. Further, EDI information can be integrated with other applications for the generation of management reports and other purposes.

This report describes EDI activities in 23 industries and analyzes issues affecting acceptance of EDI. Market forecasts and recommendations to industry participants are included.

The study is one of a series examining EDI markets and implementations.

This report contains 168 pages, including 39 exhibits.

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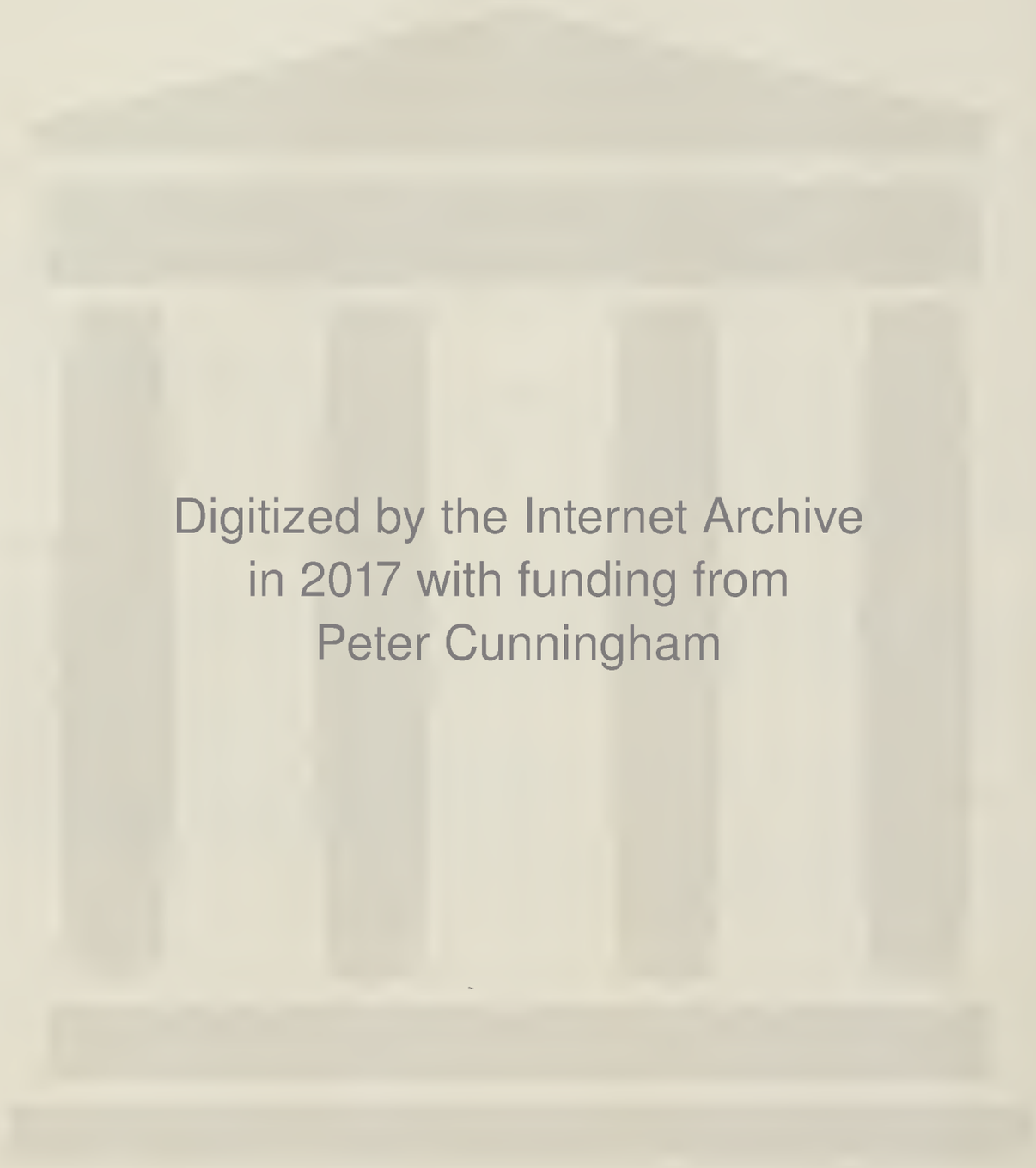

# U.S. ELECTRONIC DATA INTERCHANGE SERVICES
# 1987-1992

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# U.S. ELECTRONIC DATA INTERCHANGE SERVICES
# 1987-1992

## EXHIBITS

# 1 INTRODUCTION

# I INTRODUCTION

## A. BACKGROUND

- This report, produced by INPUT's Electronic Data Interchange Planning Service (EDIPS), examines the Electronic Data Interchange (EDI) service market.

- INPUT defines EDI as the electronic transfer of business information between organizations in a structured application (see Exhibit I-1). The information represents standard business documents such as invoices and purchase orders. EDI techniques are also used for other applications such as health insurance claims.

- For market analysis purposes, this study focuses on third-party EDI services but also examines private EDI implementations which use professional services for implementation and network services for data transmission.

- This report excludes consumer applications such as electronic shopping, Automatic Teller Machine (ATM) networks, point of sale (POS) terminals, and airline reservation systems which are considered captive networks used for transactions between two parties.

- Related to EDI are on-line order entry systems, which automate a company's internal sales or order taking functions. Such systems enable telephone sales personnel to query the corporate data base regarding product availability,

EXHIBIT I-1

# ELECTRONIC DATA INTERCHANGE

## The Computer-to-Computer Exchange of Intercompany Business Documents and Information

determine special discounts available to customers, and provide delivery dates.

- Companies are opening their existing on-line order entry systems to their customers, but unlike EDI, these systems are typically terminal-to-computer applications rather than computer-to-computer. Open order entry systems shift the burden of data entry from the supplier to the customer, offering improved service as the benefit.

- EDI is a more advanced form of order entry but goes beyond this first step of the buying and selling process.

- EDI commonly involves the transmission of data in one of several standard formats, with ANSI X12 the dominant standard. It may be necessary for data to be translated to a standard either prior to transmission or by a third-party service acting as an intermediary in the transaction. It may also be necessary for the data to be translated again into formats recognized by a trading partner's computer.

- The largest users of EDI are in the discrete manufacturing, distribution, and transportation industries, with users in the auto industry, grocery and consumer goods, warehousing, electronics, chemical, metals, paper, office supplies, and drugs. As this study reports, over 25 industries use EDI, and use is growing substantially.

- The reasons for using EDI include the time value of information, cost avoidance, better inventory control, and benefits realized through the integration of EDI data and corporate information processing.

- EDI can be done in several ways: point-to-point, directly between trading partners, on private networks, or through third parties--Remote Computer Services (RCS) or Value-Added Networks (VANs) which provide translations between dissimiliar processing systems and formats. VANS and RCS firms also serve as collection and switching services.

- Within the next five years, it is expected that thousands of companies will abandon paper purchase orders, invoices, and other routine transactions and adopt EDI standards. However, the industry must further educate would-be users to the benefits of EDI.

- Among the issues involved in EDI are standards, compatibility, security, appropriate technologies, transnational data communications, legal considerations, economic responsibilities, and its effects on current business practices.

- In the past, EDI efforts have been implemented using private standards.

  - Commonly agreed standards, such as the American National Standards Institute's ANSI X12, have now been adopted and adapted in several industries.

  - The use of standards is necessary to allow communications across industry lines, thus paving the way for additional information interchange applications.

- EDI is providing new lines of business for VANs, RCS firms, software vendors, and professional services companies. The principal participants have aggressively pursued EDI accounts and promoted EDI within industry segments, making for a competitive market environment. However, opportunities remain to be exploited.

- Users ultimately benefit from industry competition through a variety of choices, competitive pricing, and improved services.

## B. SCOPE

- The study addresses the following topics:

  - Electronic data interchange - the reasons for using the method, its relationship to electronic mail (E-mail), on-line order entry systems and logistics, and the issues and concerns of users and prospective users (see Chapter III).

  - Industry sector EDI involvement, from early users to industries newly adopting the method (see Chapter IV).

  - Market forecasts, vertical market potential for EDI services, and recommendations for VANs, RCS firms, and users (see Chapter IV).

  - Profiles of third-party EDI service providers and their industry specializations, strategies, marketing approaches, and current market shares are provided in a companion report EDI Service Provider Profiles. The report also discusses the prospects of new and potential entrants.

- Chapter II is an Executive Overview of the entire study.

- Definitions of terms used in this report are found in Appendix A.

## C. METHODOLOGY

- The research for this report consisted of:

- Corporate interviews.

  - Structured, in-depth interviews were conducted with Information Systems (IS), telecommunications, and business management personnel in 25 industries between February and March 1987. The questionnaire used is found in Appendix B.

- Vendor interviews.

  - Interviews were conducted with senior level management of VANs, RCS firms, software providers, and professional services firms.

- Industry representatives.

  - Interviews were conducted with industry association representatives and academic observers of EDI developments.

- Product and service analysis.

  - INPUT collected and analyzed information on EDI services and vendors planning EDI services and reviewed secondary research sources.

- Custom research projects.

  - INPUT has been engaged for several consulting projects bearing on EDI. While no proprietary information is revealed, the knowledge gained is represented in this report.

## D. RELATED INPUT REPORTS

- This study updates the findings of INPUT's 1985 study Electronic Data Interchange and is one of a series focused on EDI. Other reports published or planned for the series include:

  - Western European EDI Market Opportunities (published in 1986).
  - EDI Software Markets (scheduled for publication in third quarter 1987).
  - A Guide to EDI Implementation (scheduled for publication in third quarter 1987).
  - International EDI (scheduled for publication in fourth quarter 1987).
  - Prospects for Government Paperless Procurement (scheduled for publication fourth quarter 1987).

# II EXECUTIVE OVERVIEW

## II EXECUTIVE OVERVIEW

- This Executive Overview is designed in presentation format to help the reader quickly review key research findings and recommendations. It will also provide an executive presentation, complete with script, to facilitiate group communications.

- The key points of the entire report are summarized in Exhibits II-1 through II-7. On the left-hand page facing each exhibit is a script explaining that exhibit's contents.

## A. EDI TRANSMITS ELECTRONIC BUSINESS DOCUMENTS

- Electronic data interchange is the electronic transfer of business information between organizations in a structured application. It is process-to-process communication in machine readable format, overcoming organizational differences in computers, terminals, protocols, and data formats.

- While typical applications are the transfer of electronic purchase orders, invoices, bills of lading, and other documents, EDI exchanges are also used for the submission of health care insurance claims in the property/casualty industry and, recently, in the Internal Revenue Service's electronic filing program.

- For market analysis purposes, this study focuses on third-party EDI services and excludes consumer-oriented applications such as electronic shopping, Automatic Teller Machine (ATM) networks, Point of Sale (POS) terminals, and airline reservation systems.

- It also excludes person-to-person electronic mail which consists of textual messages between people rather than application-readable data.

# EDI TRANSMITS ELECTRONIC BUSINESS DOCUMENTS

- Machine Readable
- POs, Invoices, etc.
- Also Health Care Claims, Others
- Not ATM, POS, or E-Mail

## B. WHY USE EDI?

- Businesses have been electronically transferring standard business documents between trading partners for nearly 20 years. Large companies have been able to require smaller dependent suppliers to accept their defined formats.

- Now, smaller companies are using EDI, with new standard formats facilitating communications between dissimiliar systems.

- EDI can lead to substantial cost savings in the exchange of routine business documents. Manually prepared paper documents can cost between $8 and $50. With EDI, the cost is below $12, with the electronic portion costing under $1.

- Other EDI benefits are:

  - Fewer errors due to misunderstandings or rekeyed data.

  - Faster responses due to nearly instantaneous electronic communications.

  - Better customer service due to integration with order processing and other applications.

  - Enhanced control through EDI integration with management report generators and forecast and statistical analysis packages.

  - Distribution of fixed information systems costs among more departments and functions.

  - Competitive advantage.

# WHY USE EDI?

| |
|---|
| Reduced Expenses |
| Fewer Errors |
| Faster Turnaround |
| Improved Customer Service |
| Enhanced Management Control |

## C. WHO PARTICIPATES IN THE EDI MARKET?

- Large companies use EDI to communicate with their trading partners to reduce costs.

- Third-party service providers offer EDI network management services, protocol/speed conversion, error correction, data validation, format translation, and store and forward services.

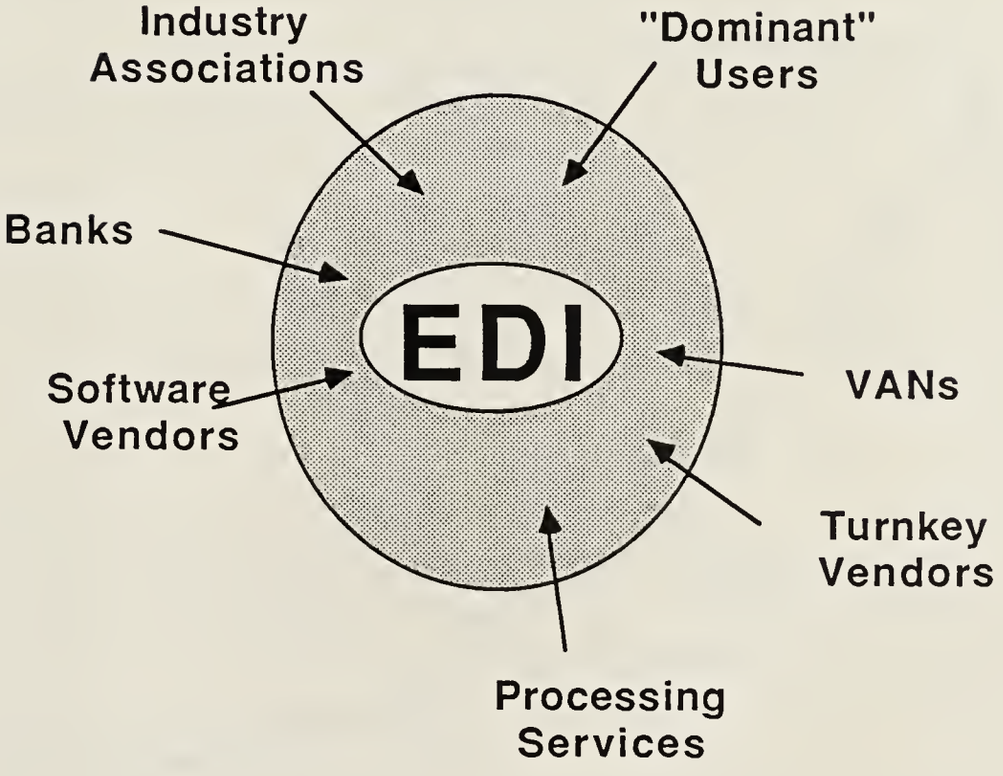
- EDI service participants include Value-Added Networks (VANs) and Remote Computing Services (RCS) such as McDonnell Douglas, General Electric Information Services, Control Data, IBM's Information Network, Sterling Software, TranSettlements, RailInc, and SCM Kleinschmidt. Other firms entering the market are ADP, Compuserve, and Western Union.

- Industry associations are helping to establish standards, design systems, endorse vendors, and represent users' interests.

- Banks see EDI as a cash management function and several are now involved in EDI.

- Software and turnkey systems vendors are also participating by adding EDI functions to their products or selling EDI services provided by others.

# WHO PARTICIPATES IN THE EDI MARKET?



## D. EXPONENTIAL EDI GROWTH: A $1.9 BILLION MARKET BY 1992

- While EDI has been available for several years, it has not grown as its benefits would indicate. The reasons include a lack of awareness, low levels of computerization, standards acceptance, economic responsibility questions, and human factors.

- Due to the convergence of several technologies and business realities, INPUT believes EDI will grow substantially, creating new market opportunities. These factors include:

  - The acceptance of microcomputers and standards.

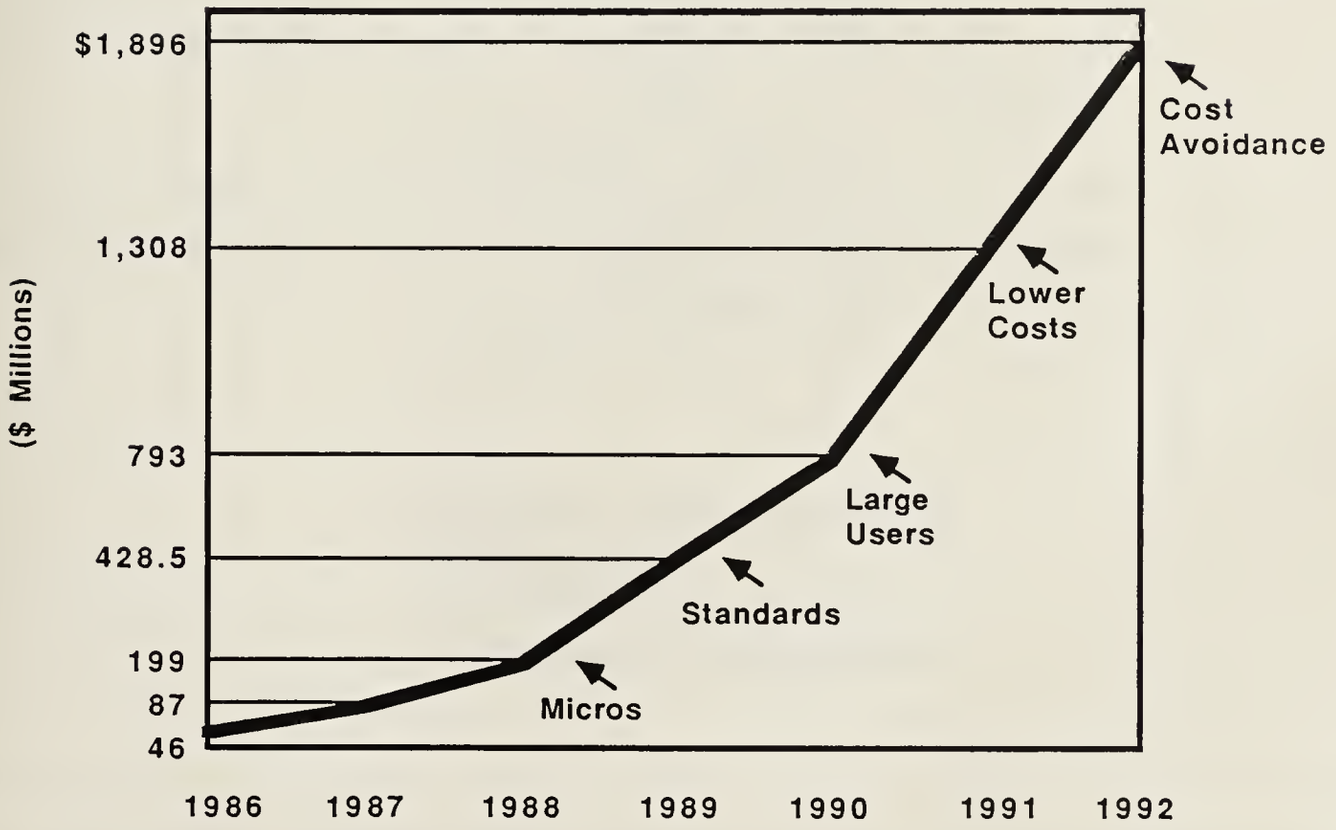
  - Lowering communications costs.

  - Large companies requiring suppliers to use EDI.

  - Need to cut costs.

- INPUT projects the market for EDI services will grow from an estimated $46 million in 1986 to approximately $1.9 billion by 1992, an average annual growth rate of 88%.

# EXPONENTIAL EDI GROWTH
# A $1.9 BILLION MARKET BY 1992



## E. INCREASED EDI AWARENESS IS NEEDED

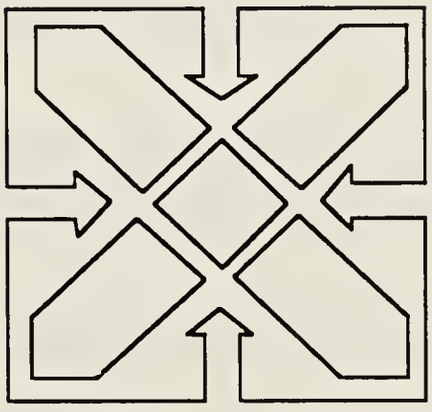
- INPUT found information services and corporate managers had limited but growing knowledge of EDI.

- INPUT's key recommendation centers on creating and building recognition of EDI's benefits.

- Market participant and industry groups should promulgate EDI awareness not only to IS but to corporate end-user departments such as purchasing, procurement, other business operations, and, perhaps most importantly, to corporate management.

- INPUT also recommends using the international EDI symbol as a marketing tool, more advertising about EDI, and the placement of general press articles, sponsored seminars, and user groups.

# INCREASED EDI AWARENESS IS NEEDED



- Promote EDI Awareness:
  - IS/Telecom
  - Corporate End Users
  - Corporate Management

## F. EDI RECOMMENDATIONS: THIRD-PARTY SERVICE PROVIDERS

- Most of the major value-added networks and several remote computing services are now providing EDI services. Present and future participants should:

  - Use EDI to prevent customer "churn."

  - Work through trade associations to investigate EDI needs in currently unserved industry segments. Several EDI implementations began as association projects.

  - Position electronic mail with forms capability as "poor-man's EDI," using hardcopy options to extend use by of both EDI and E-mail.

  - Integrate internal forms management with EDI.

  - Consider unconventional pricing schemes such as flat rates and bonus plans and premimums to encourage use.

  - Improve internetworking capabilities to allow users to interchange data across competing networks.

  - Provide implementation consulting.

  - Provide gateways to industry-specific data bases and use system transactions as the basis for new on-line data bases.

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# EDI RECOMMENDATIONS: THIRD-PARTY SERVICES

- Use EDI to Keep Customers
- Investigate Trade Association EDI Initiatives in Unserved Segments
- Integrate EDI with E-mail Hardcopy Output
- Integrate EDI with Internal Forms Processing
- Create New Data Bases From EDI Transactions

## G. USER EDI RECOMMENDATIONS

- EDI developers need to sell the EDI solution internally, working through a task force representing all affected departments and educating corporate management to EDI's benefits.

- Trading partners and potential users also need to be encouraged to use EDI. This can be accomplished by providing EDI software and sharing EDI system development costs.

- While "closed" EDI systems may be advantageous, such implementations should use the X12 EDI standard and provide gateways to third-party services to keep options open.

- EDI systems can be developed in stages, building on existing on-line order entry or other information systems.

- EDI implementation assistance is available from third-party services, industry associations, and professional services firms. They can be used to speed development and minimize risks.

# USER RECOMMENDATIONS

- Sell EDI Internally and to Trading Partners
- Build EDI onto On-Line Order Entry or Other Information Systems
- Use Development Assistance From Third Parties and Industry Associations to Minimize Risks

# III ELECTRONIC DATA INTERCHANGE: BACKGROUND, ISSUES, AND CONCERNS

# III ELECTRONIC DATA INTERCHANGE: BACKGROUND, ISSUES, AND CONCERNS

## A. BACKGROUND

### 1. BEFORE EDI

- Most large and many smaller companies have installed computerized systems to support business operations.

- Typically, a business will use its computers to prepare business documents such as purchase orders, invoices, shipping instructions, and payment authorizations which are then printed and mailed to suppliers, customers, and banks. Alternately, the telephone may be used to take orders or relay information such as status reports and shipment tracing inquiries.

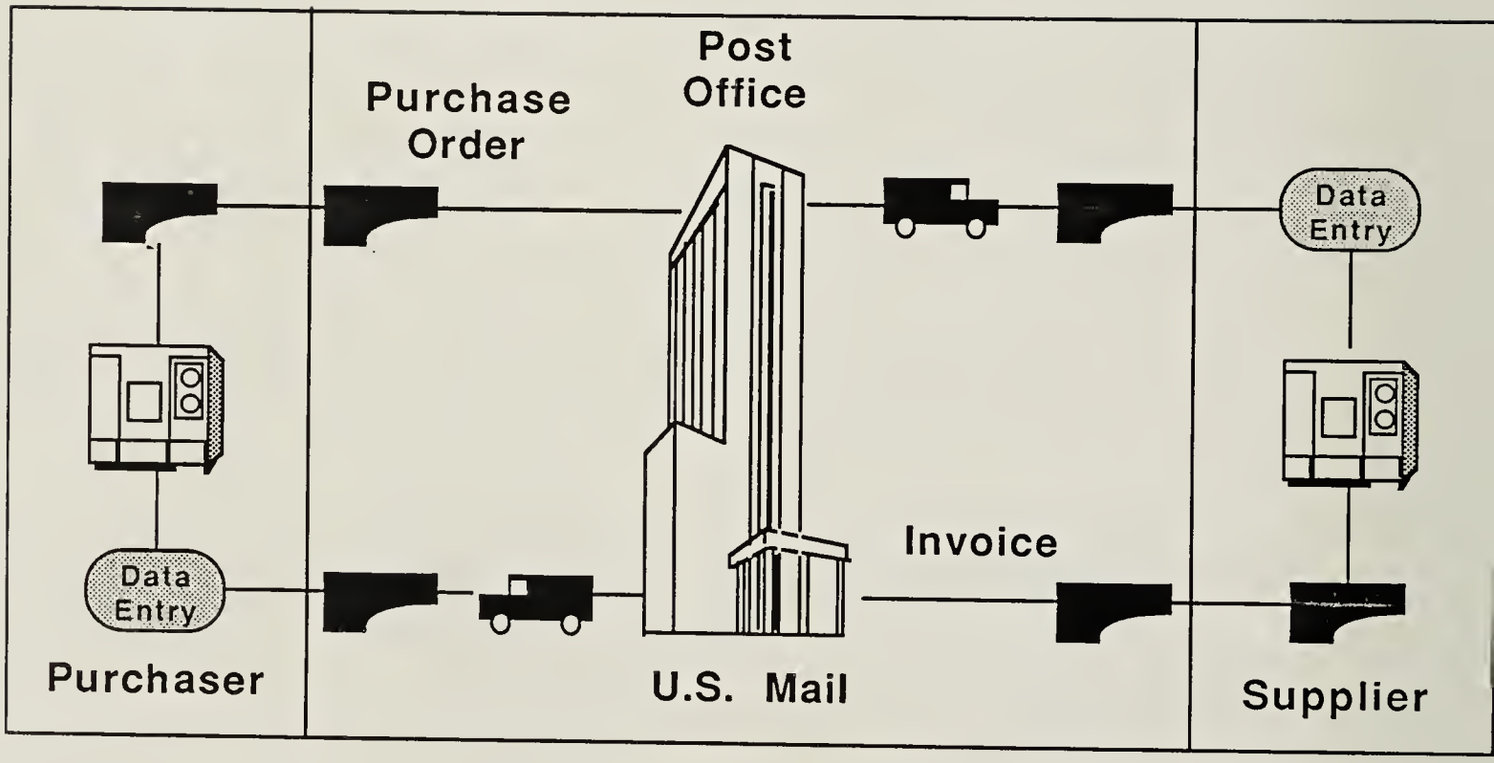
- Exhibit III-1 shows the situation without EDI.

- Many large companies use electronic means to transfer data to dependent suppliers. Often this is done by physically shipping computer tapes. Increasingly, communications networks are used.

  - Data transfers between dominant companies and their dependent suppliers often requires the trading partner to accept whatever format the large company provides, forcing the supplier to accept a proprietary standard, with the penalty being the potential loss of business.

EXHIBIT III-1

## WITHOUT EDI




EUPD1

- A supplier with many customers may be required to adapt to as many formats.

- Computer-prepared information forms a data base which can be used in a variety of corporate management reports, including budgets, accounting, forecasting, and government reports, creating benefits for many corporate departments beyond the buying and selling functions. This provides another reason for looking to the EDI solution.

2. REASONS FOR USING EDI

- The traditional ways of preparing and managing business documents have inherent problems:

  - Paper or verbal information is not directly usable by computers.

  - Telephone ordering and order taking is labor-intensive and error prone.

  - Reliance on the mails slows turnaround time.

- Further, many companies hold safety stock to meet unanticipated needs. While improving customer service, the company may be unable to quickly turn over assets, thus reducing profits.

- The situation before EDI is shown in Exhibit III-1.

3. AN ALTERNATIVE IS NEEDED

- Due to these inefficiencies, EDI is being investigated by increasing numbers of businesses.

- There are also other factors calling for the EDI alternative including:

- Increasing appreciation that information and its management can be a competitive tool.

- Awareness that new technologies can be used both economically and profitably.

- Requirements for increased productivity and reduced storage, transportation, and administration costs.

- One company's computer system could directly link to another's. However, there are some basic problems with this simplistic solution.

  - The computers may not be compatible.

  - Information may be formatted in different ways.

  - Direct computer-to-computer communications links can be inefficient and costly with scheduling and contention problems.

- Adding to these problems are complex business relationships. Companies do business with multiple business associates, often across industry segments.

- These problems are illustrated in Exhibits III-2 and III-3.

4. THREE VARIETIES OF EDI

- EDI works to overcome many of these problems by providing standards for direct or indirect linkages between corporate computers.

- Several alternatives are available:

EXHIBIT III-2

# PROBLEMS OF DIRECT COMPUTER LINKS

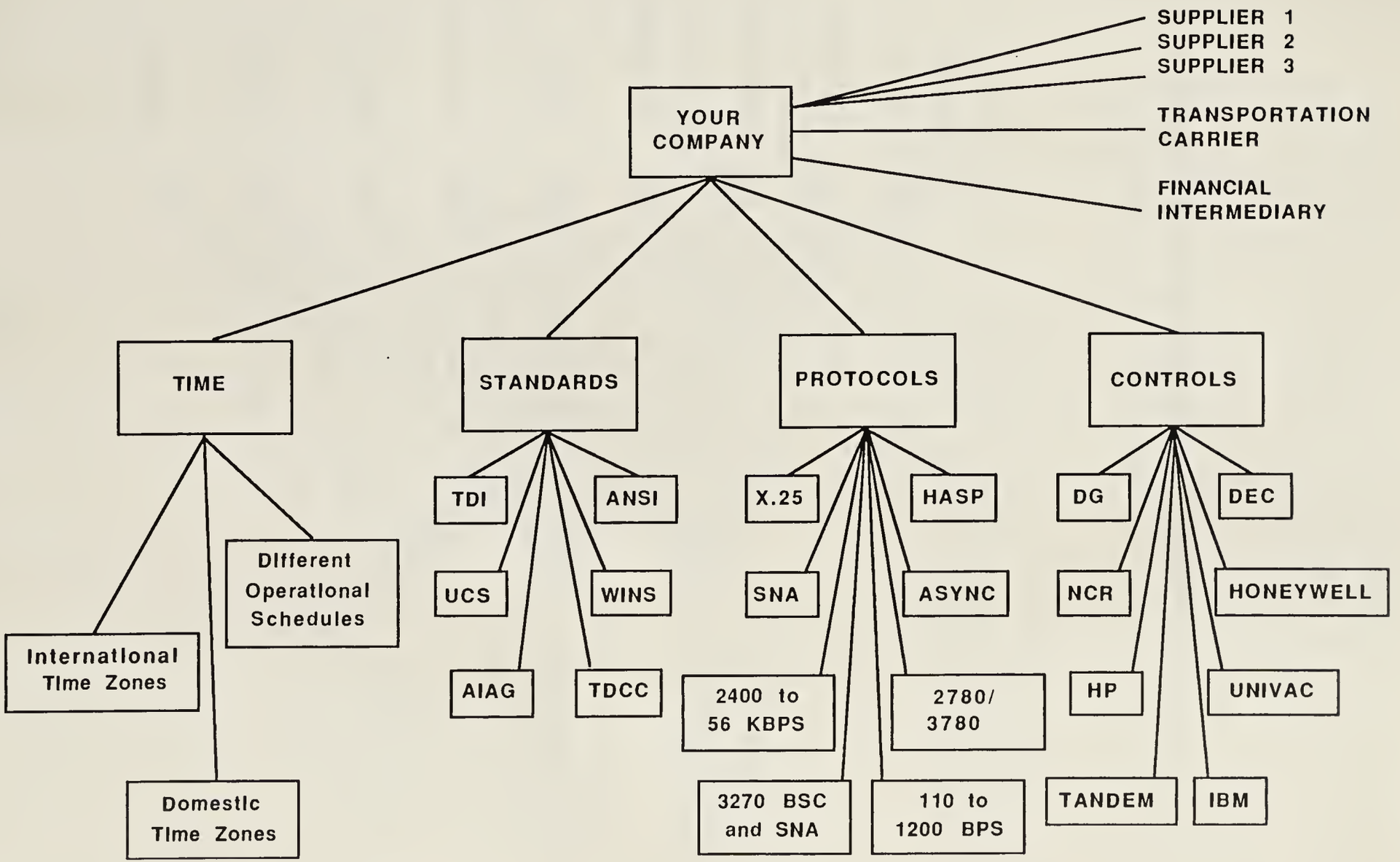
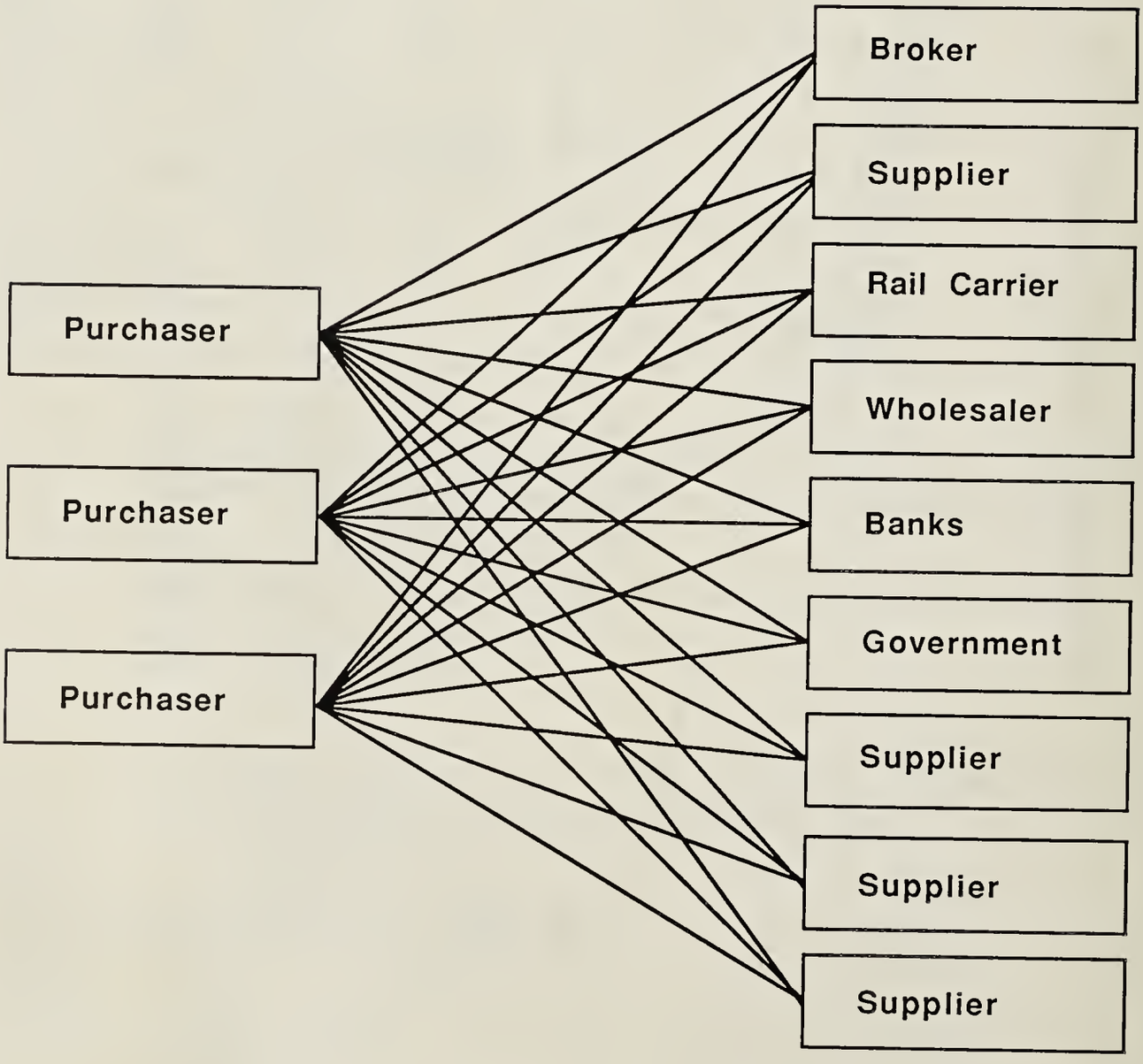


EXHIBIT III-3

## COMPLEX BUSINESS RELATIONSHIPS



- A company and its trading partners may implement a point-to-point or private network EDI system with agreements on document formats, communication protocols, and transmission time scheduling.

- Third parties such as a Value-Added Network (VAN) or a Remote Computer Service (RCS) bureau may provide conversion services for different formats or communications protocols. They also handle message mailboxing.

- A third alternative is an industry association network. Transnet (U.S.) and l' Association des Services Transports Informatiques (Europe) are examples of this approach. Transnet is discussed in the companion report EDI Service Provider Profiles.

## 5. CLOSED VERSUS OPEN EDI SYSTEMS

- Closed point-to-point EDI systems are often inconvenient since sending and receiving information may conflict with other data processing. Also, many firms do not wish to open their mainframe computers to possible security breaches.

- Proprietary, private EDI networks can serve industries with a few trading partners, but they constrict communications to those with a traditional business relationship. Some suppliers view this as desirable since it helps to build long-term trading dependencies.

- Open third-party service options are most suitable for industries with many trading partners and a high volume of transactions crossing industry lines. While universal standards are evolving, unique industry requirements can be handled by the processing intermediary.

## B. VAN SERVICES

- Value-added networks have two primary roles in EDI:
  - VANs provide the communications links for data transmission on a dial-up basis, a dedicated basis, or by providing private networks.
  - VANs also provide format, protocol, and speed conversions.
- The major VANs currently providing EDI services are McDonnell Douglas' Applied Communications Systems Company, General Electric Information Services Company, and IBM's Information Network.
  - With regulatory changes, several Regional Bell Operating Companies (RBOC) are expected to offer EDI services through newly established Local Area Data Transport (LADT) services.
  - For example, Ameritech has introduced EDI services through a joint venture with a processing firm.

## C. REMOTE COMPUTER SERVICE SOLUTIONS

- RCS firms have a role similiar to VANs except they usually do not operate their own networks. Instead, customers use a VAN, direct dial-in, or an 800 number. Alternately, customers can supply computer tapes for conversions.
- Some RCS EDI participants are Control Data Corporation's Business Information Services (working with AT&T), Sterling Software, Kleinschmidt Computers, TranSettlements, and Railinc.

- VAN and RCS EDI services are discussed in a companion report, EDI Service Provider Profiles.

- Exhibit III-4 shows VAN and RCS roles in EDI services.

## D. SOFTWARE SOLUTIONS

- Users subscribing to VAN or RCS services may rely on software hosted on the vendor's processors to perform format conversions or may internally convert private formats to industry standard formats prior to transmission. This later approach is less expensive and is the dominant trend.

- If developing a private proprietary EDI network, users can write their own EDI software or purchase it.

  - If purchased, customization by the software vendor, a professional service vendor, consultants, or the user's own development staff is usually required.

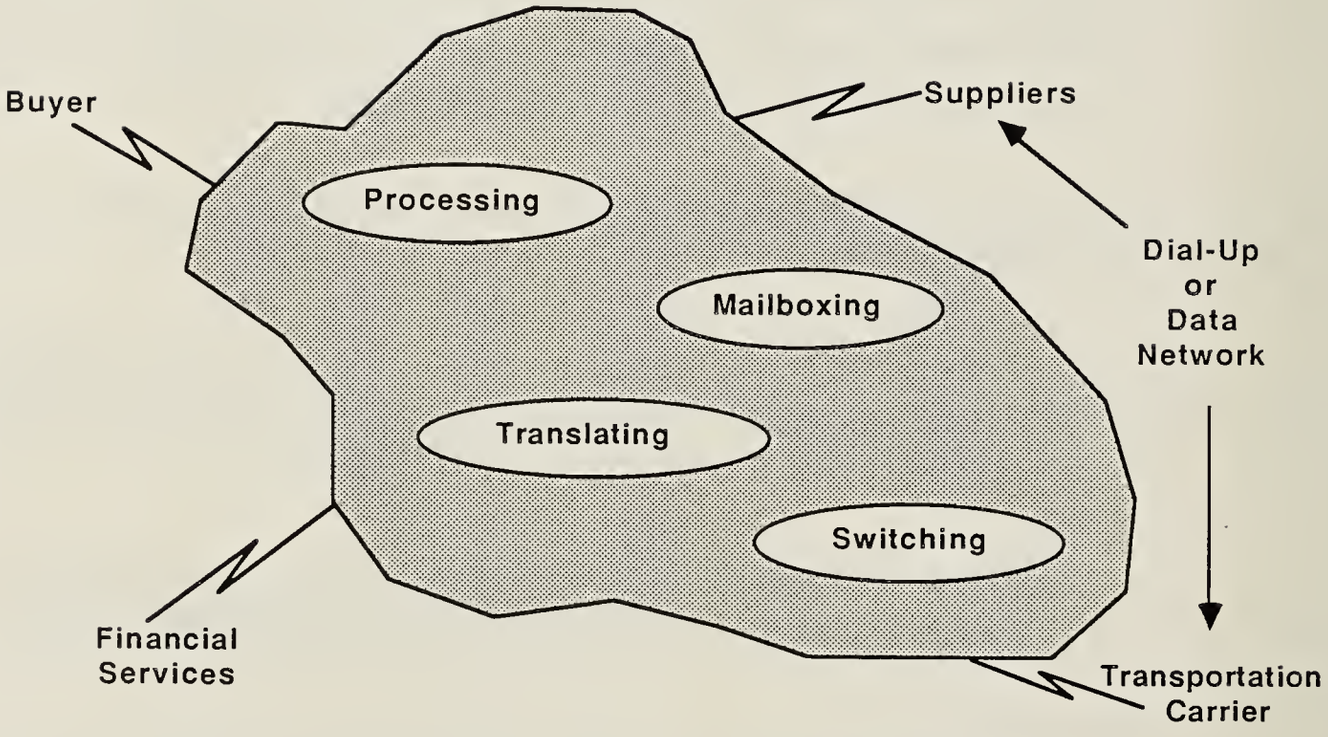
  - EDI software should be closely linked to existing applications for management reporting and other functions to optimize its usefulness.

- EDI software is available from the Transporation Data Coordinating Council, EDI Inc., The APL Group, McDonnell Douglas, Program Sciences Incorporated, CDC, TranSettlements, Inc., IBM, Metro Mark Integrated Systems, American Business Computer, DNS Associates, and several others.

- EDI software is analyzed in a companion INPUT report.

EXHIBIT III-4

## VAN/RCS ROLE IN EDI





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## E. RELATIONSHIP BETWEEN ELECTRONIC MAIL (E-MAIL) AND EDI

- E-mail is defined as person-to-person communications, usually in text. It can be computer-based, fascimile, or telex. Some consider voice store and forward (VSF or voice mail) as E-mail.

- EDI is computer-to-computer communications in machine readable form.

- Like routine paper-based mail, E-mail is used for transferring business documents.

  - Approximately half of those interviewed use the various forms of E-mail to transfer at least some of their purchase orders or invoices to trading partners.

  - One user reported that 80% of its purchasing related transactions were handled through E-mail.

  - On average, companies using E-mail send approximately 20% of their purchasing transactions this way, according to survey respondents.

- E-mail can be used for EDI-like applications with form creation options supporting order entry, inquiries, and other documents. However, these documents are not in machine readable form.

- E-mail form systems can serve as low volume EDI-like networks. They provide users with a starting point for EDI as volume grows and create a migration path for users and E-mail service providers.

## F. RELATIONSHIP BETWEEN EDI AND ON-LINE ORDER ENTRY SYSTEMS

- To support telemarketing functions, many companies have installed automated systems allowing sales agents to query a data base regarding product availability, shipping status, and the like and to allow sales personnel to enter orders electronically.

- Often these systems are enhanced to allow customers direct access to the information, either from their own terminals or from terminals provided by the supplier.

  - Such systems transfer the data entry effort from supplier to customer.

  - Although a PC may be used to access the supplier's computer, it is often in terminal emulation.

  - Some suppliers provide software to facilitate this activity.

## G. RELATIONSHIP BETWEEN EDI AND ELECTRONIC FUNDS TRANSFER

- Buying and selling relationships involve inquiring, ordering, bidding, shipping, and similiar communications. The process usually culminates with a financial exchange.

- While EDI is the transfer of information representing the first set of communications, Electronic Funds Transfer (EFT) is the transfer of monetary value.

- Financial institutions have several mechanisms for transferring value. Recently, one of these methods (called CTX) was standardized to integrate payment information with the dominant ANSI X12 EDI standard.

## H. RELATIONSHIP BETWEEN EDI AND LOGISTICS

- Logistics information refers to the location of materials in transit to or through the manufacturing and distribution process.

- Several third-party services provide logistics information to shippers to help plan and optimize their production schedules. This information is usually provided as railroad Car Location Messages (CLMs) and Shipper's Adminstrative Messages (SAMs) for several modes of transportation.

- Optimally, this form of EDI, known as Logistics Data Interchange (LDI), links into Just-In-Time (JIT) inventory management, Material Resource Planning (MRP II), and similiar applications.

## I. EDI ISSUES AND CONCERNS

- EDI involves several issues including standards, controlling and financial responsibilities, business practices, cost issues, and security.

- These concerns can influence market acceptance and the success of users' EDI implementations.

### 1. SECURITY

#### a. Confidentiality Is Critical

- Information about a company, its customers, and its sales is confidential. Other companies receive this information only to perform needed services.

- Each company and third-party vendor is responsible for keeping its data from unauthorized parties.

- The data elements which may be transmitted to authorized parties are specified in EDI standards.

b. Survey Findings

- Users interviewed by INPUT almost uniformly rated security as their highest concern.

- Users are concerned about internal breaches of security as well as the vulnerability of information through third parties.

  - Users are reluctant to allow others access to their mainframes and many isolate it from networks.

  - Using a microcomputer (or other processor) as an EDI front-end addresses the issue.

- There are also concerns that data be properly translated between formats and validated.

- Vendors are equally concerned about security. A breach of trust could have dire consequences on their business. Because security is of such concern, EDI service providers directly address the issue.

  - EDI systems are designed to provide as high a level of security as mail or telephone service; in fact, EDI is more secure due to multilevel password capabilities and other safeguards.

  - System design prevents the comingling of information. Users control trading relationships and define valid transaction types and formats.

Exceptions are flagged and resubmitted for correction or system administrator review.

- Information requests from unauthorized parties are not acknowledged, but the record is available to the operations manager for follow-up action.

- Storage techniques distribute file information making it difficult to assemble information without authorization.

- Prior to responding to inquires, senders validate communications through control headers and confirm requestor's codes with the master record.

- For electronic fund transfers, EDI standards require that communications be made only to users' banks.

    . Communications between banks uses banking industry standards.

    . A user's bank sends completed payment notifications based on actions initiated by a trading partner with their own banks.

- Third-party EDI offers a layer of security since trading partners do not directly access each other's computers.

- Many third-party vendors commission security audits covering physical as well as data security. These audits are available for customer review.

- Security concerns may be hindering development of value-added EDI generated data bases for market research, government reporting, sales planning, and other functions.

- Vendors are reluctant to propose that EDI data be used for such purposes because it may lead to the perception of security and trust violations.

- One vendor (Sterling Software), with the cooperation of users, is creating such a data base.

2. EDI STANDARDS

a. Multiple "Standards" Revolve Around X12

- The "generic" and dominant EDI standards are the American National Standards Institute (ANSI) X12 standards which have evolved to acceptance and approval of 150 transaction sets.

  - The transaction sets define data formats representing electronic equivalents of business documents.

  - They can be used with virtually any type of computer.

  - It is expected that 250 transaction sets will be approved by 1988.

- One of the problems facing those involved with standards is that multiple parties have needs which must be accommodated, and decisions are made in a committee environment. This leads to lowest common denominator standards and duplicate transaction sets covering the same type of electronic documents but with different formats.

- X12 has been adapted by several industry groups such as the automotive (AIAG), chemical (CIDX), electronics (EDX), office products (ICOPS), and transportation/distribution industries (TDCC). The TDCC family of standards includes grocery (UCS), warehousing (WINS), and standards known as Ocean, Air, Rail, and Motor.

- Each industry often has unique nuances which must be considered; accordingly, there are subtle variations in the basic standard.

- These variations take into account various measurements, special billing requirments, and/or shipping instructions.

- Certain industries, such as drug wholesaling, maintain industry-specific standards. Health care insurance claims submissions use standards established by an agency of the U.S. government.

- Additionally, so-called "private" EDI standards have been established by dominant companies in several industries which may, but more often do not, have elements in common with the other standards. These formats carry the names of the company authoring them, i.e., GM, Ford, Chrysler, K-Mart, etc.

- There is movement toward compatibility between industry-specific private EDI standards and X12 transaction sets.

- Coordinating various industry and international groups and publishing a common data dictionary is the Joint Electronic Data Interchange Committee, known as JEDI.

  - JEDI hopes to avoid duplication and redundancy.

  - The JEDI standard is officially known as EDIFACT (EDI for Administration, Commerce, and Trade).

  - The Voluntary Inter-industry Communications Standards Group (VICS) is working on cross-industry interchanges in the U.S. retail industry.

- International standards are called GTDI, for General Trade Document Interchange.

  - GTDI evolved from the United Kingdom trade facilitation agency called Simplification of International Trade Procedures (SITPRO) which lobbied for U.N. acceptance of the earlier TDI standard.

  - Work is progressing toward combining GTDI and ANSI X12 standards for international business transactions, with the first approved transaction set now available.

- Exhibit III-5 shows these standards and their relationships, with the shaded intersections implying a degree of compatibility.

  - National Association of Clearing Houses (NACHA) standards are responsible for electronic funds transfer.

  - Of the three standards contained within the NACHA grouping, CTX is most closly aligned with X12.

b. E-mail Standards May Envelope EDI

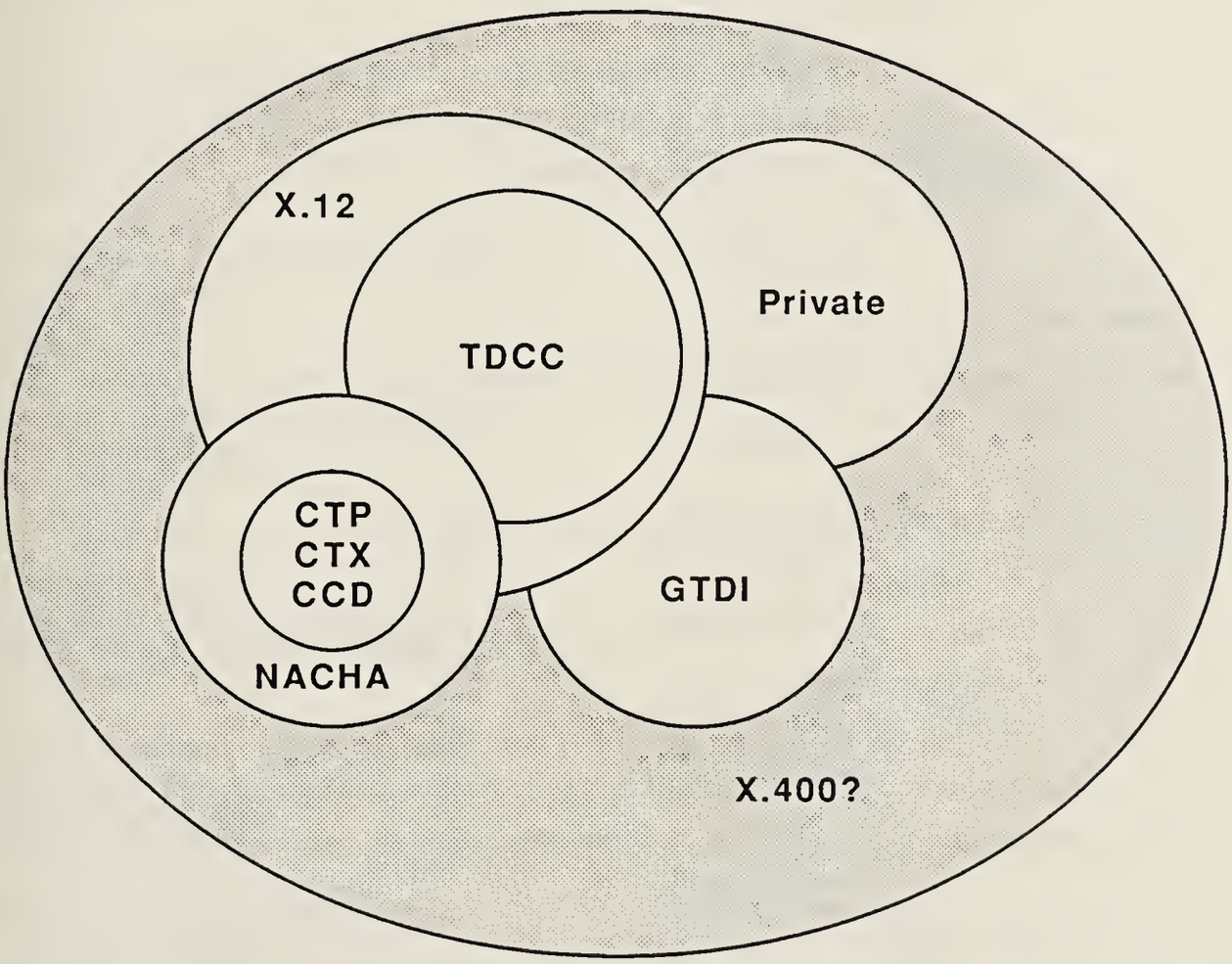
- Note the outer circle in the referenced exhibit representing the X.400 standard. Some expect this electronic mail standard to eventually encompass the subspheres of EDI; others do not subscribe to this view.

  - X.400 will apply to all forms of messaging--text, graphics, video, and voice.

  - Because of its complexity, it is not expected to be fully developed for approximately 10 years. Nevertheless, the first stages of X.400 are being accepted and implemented by E-mail software and service vendors.

EXHIBIT III-5

## EDI STANDARDS RELATIONSHIPS



- Exhibit III-6 provides the names and addresses of agencies involved in setting EDI standards.

c. Software Maintenance Is Partially a Standards Issue

- Software maintenance involves several aspects--upgrades, fixes, and maintaining standards.

- One user reports updating standards to the release one step behind the latest version. In this way, any "bugs" can be rectified by the standards maintenance organizations before creating problems at the user site.

d. Survey Findings

- The acceptance of cross-industry standards is affecting the overall growth of EDI.

  - Users averaged their concerns on standards above midrange.

  - Users averaged their concerns on software maintenance at a slightly higher rating.

- Some users feel EDI standards are unstable and are therefore reluctant to implement EDI. Others acknowledge that software and standards maintenance were likely to be ongoing chores but count on software vendors to provide updates.

- In INPUT's earlier (1985) survey, one company implementing EDI said meeting its internal needs was difficult enough without considering industry standards.

- The use of standards by major corporations, particularly those with cross-industry trading relationships, is having a major impact in turning previously "academic" standards into standards applied to real needs.

EXHIBIT III-6

# AGENCIES AND ASSOCIATIONS INVOLVED IN EDI STANDARDS

American National Standards Inst.
1430 Broadway
New York, NY 10018
(212) 354-3300

American Trucking Association
2200 Mill Road
Alexandria, VA 22314
(703) 352-2710

Data Interchange Standards Association
1800 Diagonal Road
Alexandria, VA 22314
(703) 548-7005

Electronic Data Interchange Association
1101 17th Street, NW
Washington, DC 20036-4775
(202) 293-5514

EDI Council of Canada
1185 Eglinton Avenue East, Suite 101
Don Mills, Ontario M3C 3C6, Canada
(416) 429-4444

National Association of Refrigerated Warehouses
7315 Wisconsin Avenue
Bethesda, MD 20814

National Office Products Association
3166 Des Plaines Ave., Suite 223
Des Plaines, IL 60018
(312) 297-6882

Steel Service Center Institute
1600 Terminal Tower
Cleveland, OH 44113
(216) 694-3630

American Paper Institute
260 Madison Avenue
New York, NY 10016
(212) 340-0600

Automotive Industry Action Group
North Park Plaza, Suite 830
17117 West Nine Mile Road
Southfield, MI 48075
(313) 569-6262

Graphics Communications and Computers Associations
1730 North Lynn Street, Suite 604
Arlington, VA 22209
(703) 841-8160

National Commission on International Trade Documentation
30 E. 42nd Street, Suite 1406
New York, NY 10017
(212) 687-6261

National Wholesale Druggists' Association
P.O. Box 238
Alexandria, VA 22313
(703) 684-6400

Paper Trade Associations
420 Lexington Avenue
New York, NY 10017
(212) 682-2570

Technical Assocation of the Pulp and Paper Industry
One Durwoody Park
Atlanta, GA 30338
(404) 446-1400

Uniform Code Council
7051 Corporate Way, Suite 201
Dayton, OH 45459
(513) 435-3870

3. AWARENESS

- INPUT has tracked users' self-rated awareness quotients in several surveys since 1985. Exhibit III-7 shows how this rating has changed.

- While the average EDI awareness level remains in the low midrange, awareness of EDI is clearly increasing; however, there is room for improvement.

  - Additional marketing and promotional efforts are needed since EDI is a corporate, rather than an IS, issue.

  - EDI requires broader awareness in the various corporate departments which can benefit from its use.

4. COST SAVINGS

a. Survey Results

- Interviewed users expect EDI to lead to substantial cost savings in their buying and selling relationships, but few were able to provide specifics regarding their transaction costs before and after implementing EDI. Those that did suggest savings in the $5-10 per document range.

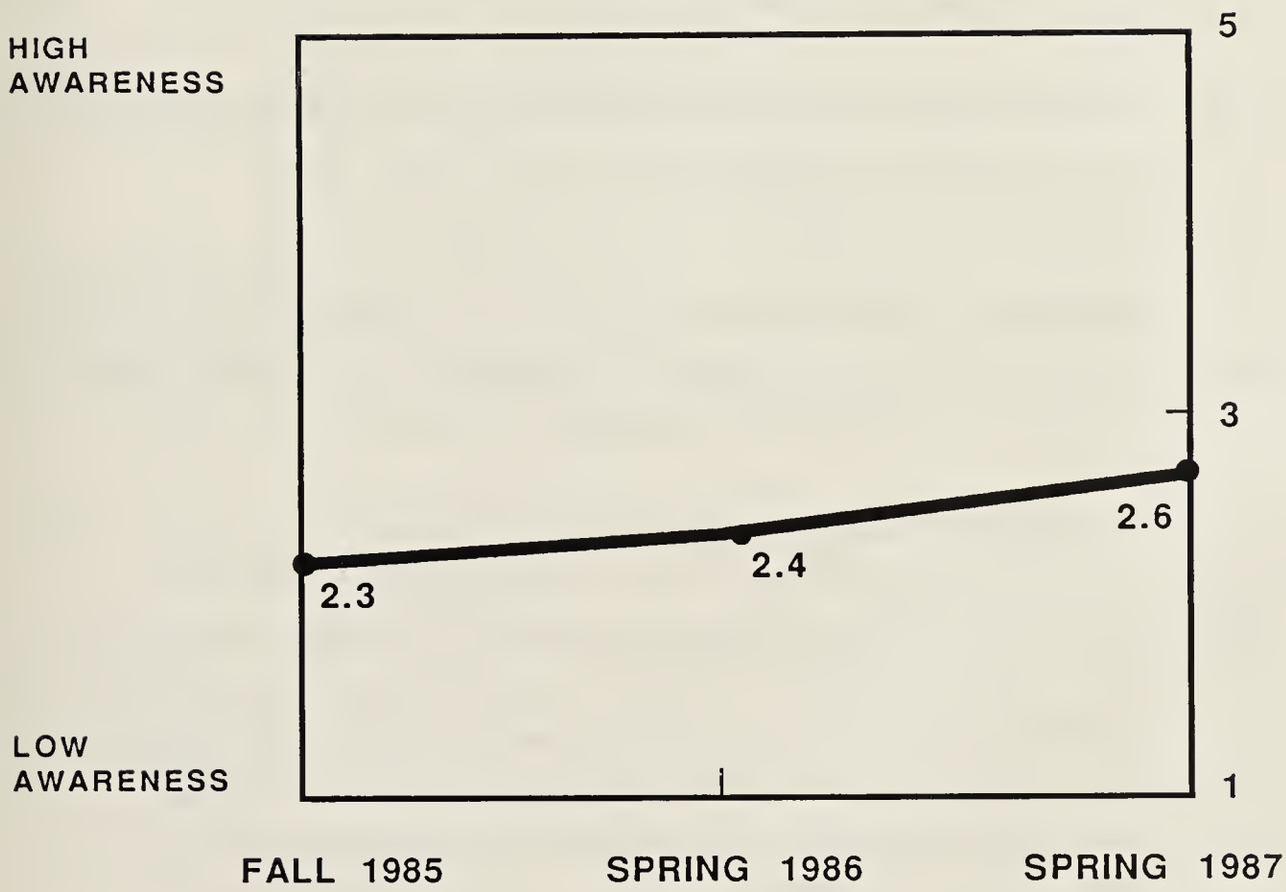
- Users in several industries have reported substantial savings. For example:

  - TCB, Inc. (Minneapolis), a speciality goods shipper, reports savings of over $100,000 per year due to staff and paper handling efficiencies.

  - Super Value Stores (Eden Prairie, MN) claims annual savings of $9 million due to EDI.

EXHIBIT III-7

## EDI AWARENESS IS GROWING



- In earlier interviews, users were asked to provide their estimate on the cost per transaction which would make converting from current systems to electronic systems worthwhile.

  - Most users provided cost ranges between $0.50 and $1.00. When including associated data entry, this increases to a $3-12 range.

  - One knowledgable user said that any transaction expense below $50 would make EDI worthwhile. This was his estimate of the average cost of handling a paper transaction.

- Cost savings can also be realized through the distribution of EDI's fixed costs over more corporate functions.

- INPUT has found that new technology cost justifications are often done on a soft dollar, qualitative basis, rather than a quantified basis. This may inhibit market acceptance as it permits objections to be raised for which there is little or no data available in response.

b. Network and Transaction Costs

- Estimates on the cost of preparing paper transactions vary widely, but they are at least the cost of an average business letter, or about $8.10. EDI can cut 20-40% or more of these costs by eliminating paper and data rekeying.

- EDI network costs can become relatively inconsequential when compared to costs of paper transactions.

- Most VAN and RCS services charge $0.50-1.00 per 1,000 characters. Volume discounts reduce these fees to $0.15 per 1,000 characters in some cases. Some also levy monthly minimum service charges of $100-300, initiation fees, and connect time charges.

## 5. COSTS OF ENTRY

- EDI users indicate the time needed to implement an EDI solution ranged from two months to one man-year, depending on the scope of the implementation.

  - Integration of EDI into mainframe production environments has been the most costly element based on internal allocation of resources.

  - Companies installing translation software usually require customization to convert or map their currently used data formats to EDI formats.

  - Links to other applications need to be written. This process is being eased through commercial systems integration contractors and by introduction of EDI modules for mainframe business applications.

- Users initiating a micro-based EDI project will incur costs equivalent to the price of a microcomputer and its associated software. Mainframe implementation costs have been reported at $20,000-70,000.

- Large users indicted they would be willing to invest considerably more (up to $500,000) to implement EDI. Such installations would typically involve large system processors and software with heavy transaction load expectations.

- A company may not have the resources to handle an EDI project due to an applications backlog. Several companies interviewed would employ consultants or professional services firms to handle customization and assist in implementation.

- Users interviewed reported their concern about the entire EDI system, including hardware and software needed, at 3.5 on average, with a "5" rating being a great concern.

- EDI does not represent a new technology but rather a new approach, using standard technology for a basic business problem.

- The rating given generally reflects IS' immediate operational and maintenance priorities and cost concerns.

6. WHO PAYS?

- Most EDI third-party services permit billing to be split between trading partners, based on processing services and translations provided.

- Vendors are starting to offer detailed billing statements regarding the transactions processed by the network in a "telephone bill" format, showing who transmitted what and when.

- Proprietary systems can be designed to allocate costs to the most appropriate party. For example, the costs of transmitting a purchase order rightly belongs to the issuer, while electronic invoicing costs should be borne by the supplier.

- Larger companies may subsidize smaller customers' EDI expenses.

7. WHO CONTROLS?

- Users interviewed in an earlier survey were split almost equally between those who would prefer to operate an EDI system themselves and those who would prefer to use a third-party service.

  - The reasons given were related to a company's ability to manage and operate the system and the belief that a third party is the most efficient means to communicate with many trading partners.

  - Those wishing to operate their own system were typically large companies wanting to closely bind their customers to them or those

needing to communicate with only a few corporate subsidiaries or affiliates.

8. COMPETITIVE CONCERNS

- Several users reported they were investigating or implementing EDI because of competitive reasons, either their direct competitors were believed to be implementing EDI or their major customers indicated (sometimes rather strongly) that future business would be dependent on the supplier's ability to handle electronic transactions.

- The average rating given regarding a company's competitors' actions in EDI was a low 2.2 on the scale of 5.

  - Users planning or now using EDI rated this concern higher, at 2.6, reflecting one justification for implementing EDI.

  - Users with no EDI plans were less concerned with competition and rated this factor 1.8.

9. INTERNAL CHANGES

- Users uniformly rated their concerns over the changes required in converting paper forms to electronic methods above midrange, regardless of EDI use or planning.

- Usually the change from manual to electronic systems will involve parallel systems as the changeover is implemented. This does add the additional costs of maintaining dual systems.

- It should be noted that users converting to EDI who wish to do business with others maintaining paper-based systems can do so without operating a duplicate system. At least one EDI conversion service (operated by Sterling Software) converts data to paper documents and vice-versa.

- Users usually test one or a few documents at a time to allow for gradual system adoption with minimal distruption or "surprises."

  - Users have gotten "stuck" in pilots, primarily because EDI may have been implemented under IS' direction without a corporate mandate or functional department champion.

  - These pilots may have been considered demonstration projects by the IS department.

10. LEGALITY

- The acceptance of EDI-transmitted documents as binding contracts is left to the marketplace and negotiation between individual buyers and sellers. Trading partners usually negotiate prior to electronic trading an agreement that EDI documents will have the same status as their paper-based equivalents.

- Assuming the EDI system verifies receipt of data with a functional acknowledgement, EDI transmissions have the same legal force as Telex which uses an answerback code to verify transmission.

11. VENDOR-RELATED CONCERNS

a. Reliance on One Vendor or Service

- Users rated this concern slightly below midrange. Since several vendors now offer EDI services, most users have options.

  - The issue becomes more critical in certain industries (such as rail transporation) where one or a relativly few vendors specialize.

- In such cases, a private EDI implementation may be appropriate, assuming the user has the necessary capabilities and resources.

- Service providers reinforce their relationships with users through user groups, newsletters, and professional services. It is obviously in their interests to maintain long-term relationships to gain marketshare and to recover sales and product development expenses.

b. Vendor Viability

- Users rated this concern fairly high.

- Users need to be assured that any investment or effort incurred evaluating vendors and encouraging their trading partners to use a specific vendor will not have been in vain.

- Vendors rumored to be acquisition candidates or facing unfavorable financial news (which may be unrelated to their EDI business) need to overcome users' perceptions of vendor instability. This becomes a public relations task.

12. HUMAN AND BUSINESS FACTORS

- There are a number of human and business factors to be considered by those promoting EDI systems.

a. Human Relationships

- Relationships developed over time can hinder acceptance of EDI. People like personal contact with business associates.

- One providor of a proprietary EDI system reported on how people factors become important.

- The system was initially perceived as a threat by both internal and external people. The project director worked to allay those fears through internal marketing and by designing the system with input from the external merchants who would use it.

- The system was designed to be flexible; a rigid system would cause frustration leading to disuse.

- The company found that the system supplements human interactions and that personalities remain important.

    . EDI does not lead to bypassing salesmen or brokers or impeding personal relationships in the sales channel.

    . Rather, because less time is spent by sales staff correcting errors and handling routine paperwork, sales calls are more productive and customer service is improved.

- The system has reduced the number of routine phone calls and the remaining calls are more precise. Users have more background information and know how they want to resolve issues, saving time and gaining productivity.

- EDI is also seen as helping to mitigate the problems of high personnel turnovers in order processing and similiar clerical functions. Less experienced operators become more efficient due to the intelligence of the EDI system and can better represent a company.

b. Attitude and "Turf" Factors

- IS managers are overcoming their "protective" postures regarding the facilities in their charge. There is recognition that IS serves the company and is not an entity unto itself.

- Since EDI replaces current methods, functional managers have often developed protective attitudes toward their units and are resistant to change.

- These problems point to the need for EDI to become a corporate-wide project.

  - Not only can EDI benefit individual departments, but it benefits the entire corporation.

  - However, top-down mandates for EDI need to be approached cautiously. Without functional and IS managers involved in the decision planning process, resistance can result.

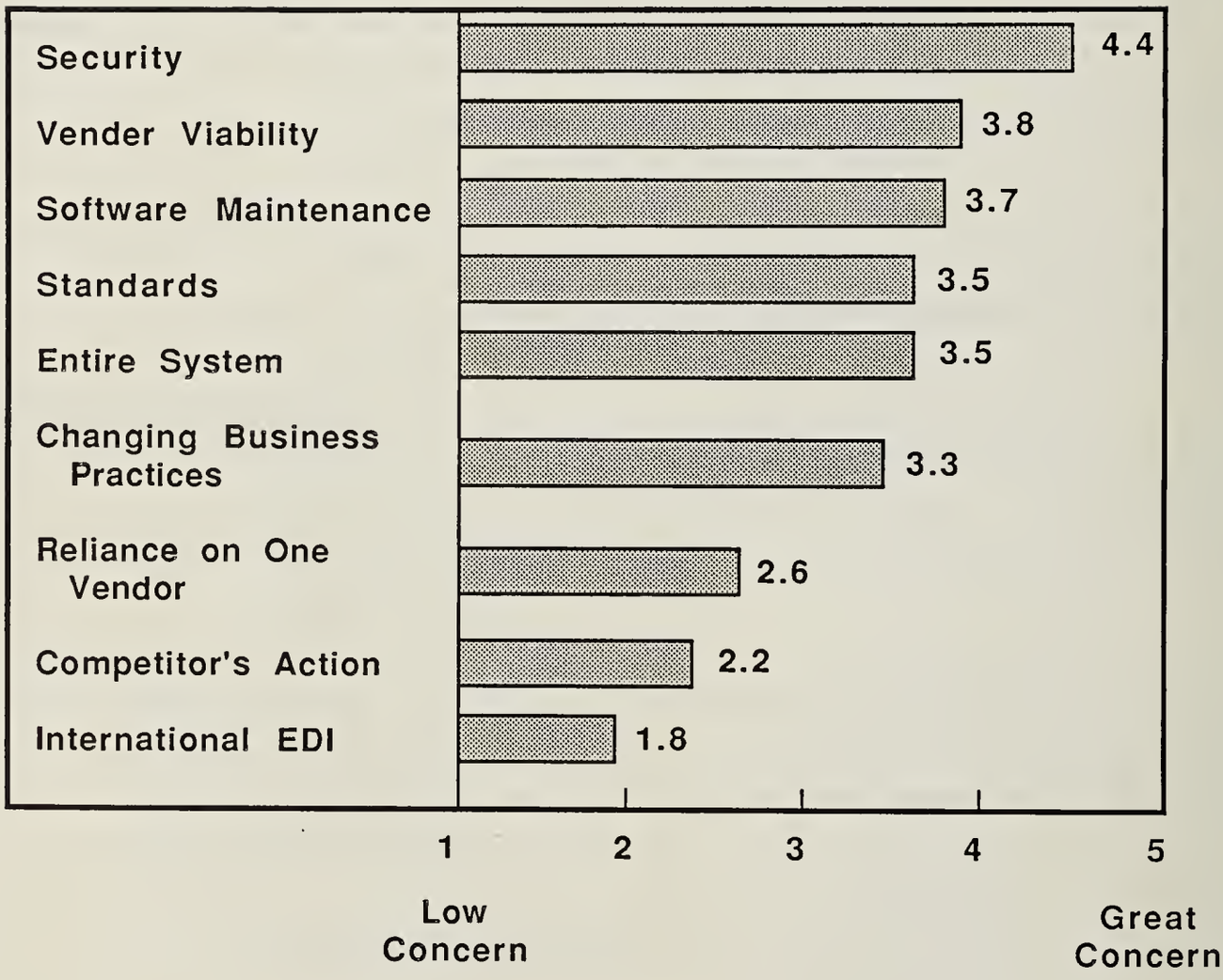
  - INPUT recommends a task force approach in implementing EDI.

- Users' ratings of EDI concerns are shown in Exhibit III-8.

- The next chapter discusses EDI's driving and inhibiting forces and describes EDI's status in several industries.

EXHIBIT III-8

## USERS' EDI CONCERNS




EUPD1





IN

# IV INDUSTRY SECTOR INVOLVEMENT IN EDI

# IV INDUSTRY SECTOR INVOLVMENT IN EDI

- This chapter first presents an overview of market factors driving and inhibiting EDI acceptance. Then, individual market sector activity is reported with leading participants identified.

## A. OVERVIEW

### 1. DRIVING FORCES

- There is clearly a convergence of technological and business factors which are driving EDI use, as shown in Exhibit IV-1.

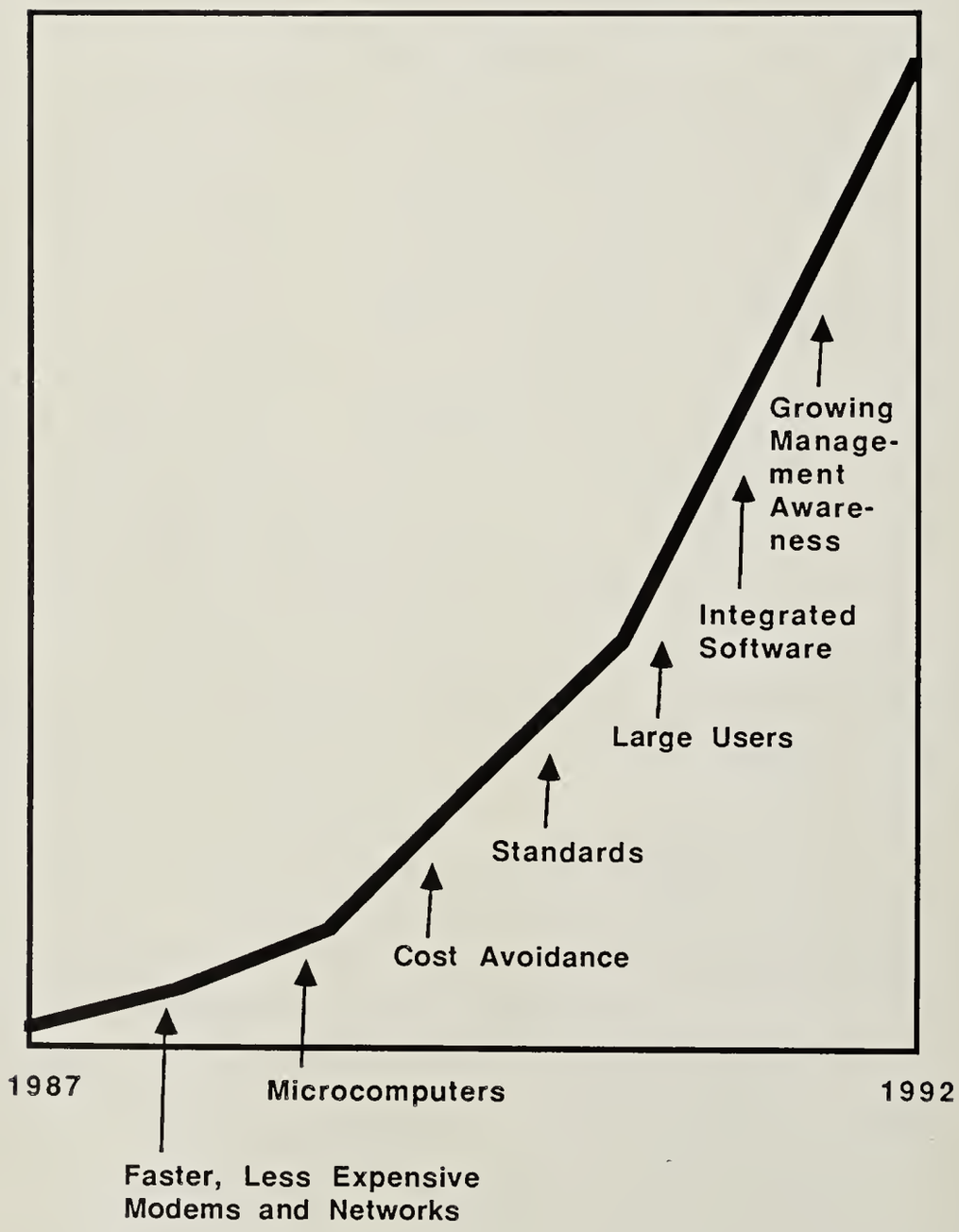
- Most of these factors are self-descriptive; however, some require amplification.

#### a. Cost Avoidance

- Many companies have looked to EDI as a means of reducing expenses. This is especially critical in industries such as automobile and heavy equipment manufacturing and apparel where offshore suppliers have put severe price pressures on "made in U.S.A." products.

EXHIBIT IV-1

## POSITIVE FACTORS IMPACTING EDI





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b. Large Users

- Companies dominating their industries have forced dependent suppliers to use EDI as a condition of doing business.

c. Integrated Software

- Although few packages are currently available "off the shelf," major software providers, in response to customer demands, are looking to provide EDI modules to manufacturing, inventory management, and financial applications to expand the utility of their products and improve add-on sales.

2. INHIBITING FORCES

- As there are market drivers, there are inhibitors, as shown in Exhibit IV-2. Most of these inhibiting factors are self-descriptive, but some discussion will aid appreciation.

a. Resistance to Change, Perpetual Pilots, and Backlogs

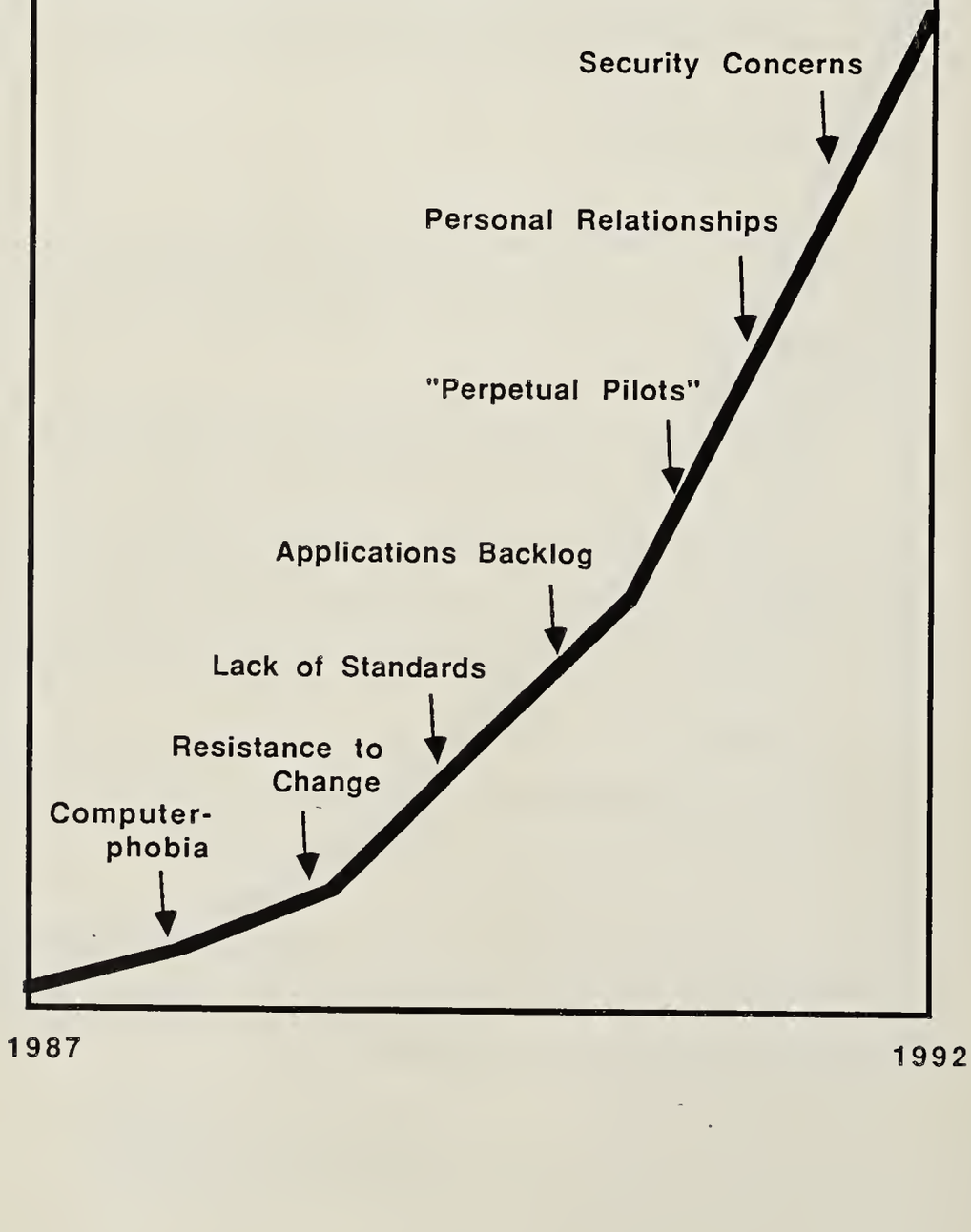
- Without management directives to implement EDI, many corporate end-user departments are static, handling business as they always have. The press of daily activities and "turf" factors often prevent advanced planning.

- IS departments have often started with EDI to gain experience with the technique. However, end-user departments often do not take advantage of the opportunity due to the reasons described above.

- Further, the applications backlog may prevent IS departments from implementing EDI without an additional resource allocation and a high priority impetus from corporate management.

EXHIBIT IV-2

## NEGATIVE FACTORS IMPACTING EDI



b. Lack of Standards

- Although there are approximately 150 transaction sets covered by EDI standards, users still perceive standards as unsettled.

c. Security Concerns

- Although vendors work to insure data security, many companies are reluctant to allow links to their production mainframes for fear of security breaches. Some companies are concerned about internal authorizations and duplicate paper and electronic transactions.

3. ACTIVITY LEVELS - NOW AND PROJECTED

- Users and prospects interviewed by INPUT reported EDI transaction growth between 1985 and 1986 ranged between 1% and 500%, with the average being 12% when extraordinary growth rates were eliminiated from the tabulation.

- On average, estimated transaction growth of 18% was forecast between 1986 and 1987. However, INPUT believes large users will create a far higher EDI transaction growth rate than suggested by the survey due to the "80/20" rule.

4. WHO IMPLEMENTS EDI?

- Users and prospective users interviewed by INPUT hold overwhelmingly that the IS department is responsible for the overall implementation of EDI. Since EDI is an application of computing and communications, this is to be expected.

- However, IS will not necessarily go it alone.

  - Users planning or in the early stages of implementation rated the likelihood they would use a third party to assist them as 2.9, with 5 being very likely.

. Professional services firms and industry associations were the most cited sources of this assistance.

. These users were less likely to totally implement the system themselves, rating this option at 2.1.

- However, 43% of the actual users and more advanced implementors of EDI reported using a third party for help, with VANs and RCS firms the most often cited source of this assistance. The balance said they implemented EDI totally themselves.

- These findings are shown in Exhibit IV-3.

- Several third-party service vendors also provide professional services in training and education, software customization, and project management to assist users developing EDI systems. As it is in their interests to encourage use, these services are often provided at no charge.

- Since optimization of EDI cuts across multiple departmental lines, optimization may be seen as a risky project. Some firms seek Commercial Systems Integration (CSI) skills to build the system and reduce risks.

  - CSI service providers take total responsibility for developing the system from project design through management and implementation, bringing together the necessary computing, telecommunications, and software.

  - Some CSI vendors go beyond these activities to actually manage users' facilities.

- Commercial systems integration is the subject of a 1987 Market Analysis and Planning Service (MAPS) INPUT report.

EXHIBIT IV-3

## EDI IMPLEMENTATION ASSISTANCE

| RESPONDENT | USE THIRD PARTY?* | LIKELY SOURCE | IMPLEMENT ALONE?* |
|---|---|---|---|
| Planning or Early Implementation Stage | 2.9* | Professional Services, Industry Associations | 2.1* |
| Current Users/ Advanced Implementation Stage | 43% | VAN or RCS | 57% |

*5 = Highly Likely

5. WHO MANAGES EDI OPERATIONS?

- Functional departments will be the end users of EDI, as IS will implement and maintain overall responsibility for EDI operations.

## B. INDUSTRY ACTIVITIES

- This section profiles EDI activities in several industry segments to provide indications of market maturity.

1. DISCRETE MANUFACTURING

a. Automobile Manufacturing

- The auto industry is attempting to recover from losses due to competition from offshore (principally Japanese) automakers.

- It is adapting technology for quality control improvements, cost reduction, and also to provide for differentiated products by using technology in automobiles since mechanical innovations are now less possible.

- The industry is a pioneer in EDI, initially with proprietary but largely incompatible systems linking suppliers to the major automakers. These activities span the last decade.

- Auto industry EDI use is particularly important since its estimated 25,000-35,000 suppliers represent virtually every industrial segment. Detroit's automakers are requiring their suppliers to use EDI or EDI-like systems, thus creating broader market acceptance.

- When coupled to Just-In-Time (JIT) inventory management techniques, EDI becomes a potent cost reduction tool.

  - JIT describes parts manufactured and delivered immediately prior to need, thus reducing inventory costs.

  - It also requires suppliers to quickly implement production changes. EDI supports such speedy changes.

- EDI is credited with reducing the manufacturing costs of an automobile by $100-200. When coupled to other productivity measures such as JIT, standardized bar coding, reusable plastic containers, and stabilized scheduling, manufacturing costs can be reduced by an estimated $500 per car.

- The industry advocate and coordinator for using technology is the Automobile Industry Action Group (AIAG), a non-profit trade association representing U.S. and Canadian suppliers and manufacturers.

- AIAG officials expect auto industry documentation to become largely paperless within the next few years and is working to reduce the hundreds of forms auto companies use to order, ship, and confirm to a few.

- While individual automakers have used electronic means to transmit releases to their largest suppliers for over a decade, these systems use unique formats. Accordingly, problems remain to be addressed.

  - The current standards are based on the requirements of the largest automakers, resulting in redundancies and some lack of uniformity, even between divisions of the same automaker.

  - The AIAG established its own EDI standards, but in the past year has moved to bring these standards into compliance with X12 standards.

- EDS, a division of General Motors, is working to standardize the EDI approach across independent GM divisions.

- Future automotive industry EDI enhancements will support the interchange of engineering drawings between automobile designers and suppliers, an application also of interest in the aerospace industry. The use of CAD/CAM drawings in EDI-type systems is described in Chapter VI.

b. Electrical Supplies/Electronics

- The industry has adapted X12 into its "EDX" standard, sponsored and managed by the National Electrical Manufacturers Association, the National Association of Electrical Distributors, and the National Electrical Manufacturer's Representatives Associations.

- ANSI X12 was chosen rather than an industry-specific standard because the industry trades with other industry groups.

- One company reported reducing its order entry department staffing by approximately 25% due to EDI. Approximately 35% of this company's transaction volume is handled computer-to-computer with sales representatives.

- Several large electronics firms (e.g., RCA and Hewlett-Packard) have implemented EDI using third-party transmission networks. RCA is reportedly enhancing its system to use modified X12 standards, and HP is working on a uniform approach among its various units.

- Escort, an earlier EDI-like system promoted by an industry group, was managed by Control Data. It fell into disuse as electronics distributors and not manufacturers or customers were involved in its design. It was also cumbersome to use.

c. Telecommunications

- The Telecommunications Industry Forum (TCIF), representing a subsegment of the electronics industry (i.e., equipment rather than services), is working to gain industry acceptance of X12 standards to overcome the problems associated with nonstandard formats and to permit inter-industry communications. Bar coding use is also being promoted by the group.

d. Apparel/Textiles

- According to industry research, the annual profit potential of the apparel industry is $100 billion, but 25% of this potential is lost due to unplanned markdowns, with 17% of the loss found at the retail level. If retailers do not achieve the anticipated level of sales immediately, markdowns are taken.

  - Contributing to this loss is a traditionally long-ordering manufacturing and delivery cycle.

  - Overseas suppliers may take as long as six months to fill orders.

  - This time lag means buying decisions may be difficult due to customer style and taste changes.

  - Conversely, if the ordering/delivery cycle is reduced, manufacturers can quickly respond to retail outlets' needs for in-demand items.

- U. S. apparel manufacturers believe that due to their location, "quick response" can be a competitive advantage over foreign suppliers. Manufacturers see EDI as helping reduce the cycle to as much as four to six weeks, supporting reordering of fast selling products.

- The apparel industry's trade group "Crafted with Pride" is chartered to promote "Made in America" and "quick response" techniques.

- In order for quick response to be accomplished, product sales data needs to be collected at the retail level and sent to apparel manufacturers and, ultimately, to textile manufacturers for clothing fabrication and distribution.

- Since textile companies provide material for apparel manufacturers, automobile and other industrial manufacturers, and floor coverings, standardization of electronic formats is needed. Two industry groups have been working on standardization.

  - The Textile/Apparel Linkage Council (TALC) has approved a subset of X12 for the industry called Textile Apparel Manufacturer's Communications Standards (TAMCS).

  - The Voluntary Inter-industry Communications Standards (VICS) is working on communications standards between manufacturers and retailers.

- Additionally, Universal Product Code bar codings are being used to handle goods identification, simplifying data input to an EDI system.

- While purchase orders and invoices are important to the industry's EDI initiatives, shipping notification is the most important transaction.

  - Since it may take several days for a shipment of fabric to be delivered to an apparel manufacturer, having detailed information regarding color and size of en route material helps optimize use of supplies, reduces inventory, and improves cash flow management.

- Most large apparel and textile companies are involved in EDI.

  - Milliken & Company is a leading EDI user.

- Haggar offers the Haggar Order Transmission (HOT) system supporting rapid delivery of products to retailers.

- Levi Straus developed Levilink, a series of electronic services, using GEISCO's EDI*Express for networking and EDI connections to retailers.

- Working as an GEISCO EDI agent, Apparel Computer Systems (now ACS, Inc. in Concord, CA), a software, turnkey systems, and data base vendor, is selling EDI*Express services.

  . Founded in 1978, ACS, Inc. manufactures and sells software for IBM System/36 and System/38 computers.

  . In Spring 1987, the company introduced EDI software for these processors.

  . Apparelnet is an on-line industry-specific data base with 19,000 suppliers of fabric, trims, equipment, supplies, and services listed, as well as 3,100 sewing contractors. It also has E-mail capabilities.

  . ACS handles sales, training, installation, and support of GEISCO's EDI services to a major portion of the apparel manufacturing industry.

- EDI in these industries is summarized in Exhibit IV-4.

- Other discrete manufacturers using EDI are in heavy equipment (i.e., Navistar, Caterpiller) and automotive aftermarket parts.

EXHIBIT IV-4

## EDI IN DISCRETE MANUFACTURING

| SEGMENT | ACTIVITY SUMMARY |
|---|---|
| Auto | EDI Essential to Reduce Costs; "Big 3" Private Nets Moving to Public Standards |
| Electronics | EDX Conforms to X12 |
| Telecommunications Equipment | TCIF Just Starting - Promoting X12 and Bar Coding |
| Apparel | EDI Tied to "Crafted with Pride in the USA" |

## 2. PROCESS MANUFACTURING

### a. Paper

- The paper industry has been resistant to change, but there is significant activity toward EDI as a means of improving productivity.

- Many of the larger paper companies sell directly to large end users.

  - Proprietary networks are not seen as efficient solutions because they require a large number network of nodes.

  - Some interviewed users feel it is advantageous to have industry endorsement and specifications allowing use of one network and one format for communications.

- Because of this need, the Graphics Communications Association and five other U.S. and Canadian paper and publishing industry associations issued an RFP for a system based on the Electronic Manifesting and Bar Coding (EMBARC) specification for better order tracking.

  - Manifests describe shipments and provide billing information.

  - EMBARC integrates with bar coding standards.

- Upon publishing the specification, participants recognized that the point-to-point connections originally envisioned would create problems:

  - Each computer system would need to maintain translation tables.

  - Participants have different communications protocols.

- A store and forward system providing translation would solve these problems.

- The specification was modified and a task force formed to evaluate EDI service vendors.

- The association endorsed GEISCO as the industry's service provider for the EMLINK service.

- The endorsement strategy was taken for several reasons:

  - The association did not want to establish an industry standard.

  - It was concerned about antitrust implications.

  - It also did not want to not lock the industry into one vendor, preventing competitive benefits such as high service levels, competitive pricing, and innovation.

b. Metals

- For approximately ten years, the American Iron and Steel Institute has been developing a mainframe-based customer communications system called COMPORD (for computer ordering). Due to its complexity, COMPORD has not been accepted by many in the industry.

- Recently, more easily used microcomputer software providing the same functionality has been introduced by Can/Am Tech (U.S.A) Inc. (Pittsburg, PA). Called E-Z Order, the software is the only industry-specific EDI application now available, and it is being adopted by Steel Service Center Institute (Cleveland) members.

- The American Iron and Steel Institute has established standards for 46 steel industry products which are ANSI approved, as are aluminum product codes. Copper and brass product codes are under development. Metal industry products are described by chemistry, dimension, and finish as well as more traditional descriptors.

- The iron and steel industry association reports that of 24 companies surveyed with data processing departments of five or more, 19 reported inquiries from customers about EDI.

- Joseph T. Ryerson & Son, Inc., a subsidiary of Inland Steel Industries (Chicago), has notified 30 key suppliers that it expects them to implement EDI within 1987.

c. Oil and Gas

- Impacted by lowering oil prices, the petrochemical industry has been seeking ways to mitigate losses and improve efficiency.

- Its business arrangements are typically for large volumes over few transactions.

- The Council of Petroleum Accounting Standards (COPAS) is working to integrate automated EDI systems for the oil and gas industry.

- As with other industries, there are specific needs.

  - For example, the industry requires special documents to handle the joint interest bill where multiple oil companies operate an oil well, sharing revenues and expenses.

  - COPAS has established standard expense codes and item numbers for equipment used in oil drilling operations.

d. Chemicals

- The chemical industry has been involved in EDI for two years, driven by demands from its customers in several industries.

- The Chemical Industry Data Exchange (CIDX) format has been pilot tested by approximately 20 companies using X12 formats for several documents.

- Currently, approximately 30 companies are involved in EDI, with increasing volume and additional transaction set use reported.

- EDI in these industries is summarized in Exhibit IV-5.

3. TRANSPORTATION INDUSTRY

- The transportation industry is subsegmented into motor, rail, air, and ocean carriers.

- Deregulation is causing rapid obsolescence of existing systems. To remain viable in the new environment, transporation firms are placing increasing emphasis on computerized systems to improve their competitiveness and customer service.

a. Railroads

- Railroads are facing revenue declines and are using technology as one way of reducing costs.

  - The industry saw a 1985 revenue decline of 10.4%.

  - Profits remained flat as revenue per traffic unit dropped approximately 5%.

EXHIBIT IV-5

## EDI IN PROCESS MANUFACTURING

| SEGMENT | ACTIVITY SUMMARY |
|---|---|
| Paper Products | EMLINK on GEISCO - Trade Association Product |
| Metals | Growing List of ANSI Product Code Descriptors |
| Oil/Gas | COPAS Integrating EDI; Working on Unique Needs |
| Chemicals | CIDX Used by 30+ Companies |

- Railways were one of the first industries to use EDI technologies.

  - Individual companies have access to the technology due to their size relative to other industries.

  - Every major rail company has extensive computer and communications facilities and excess capacity able to handle the needs of companies outside the industry.

  - Burlington Northern (BN) has implemented its Electronic Business Network for all its business transactions (including EDI).

    - BN is using touch-tone telephones, terminals, and PCs as query devices to reduce the complexity of electronic communications by customers, encouraging them to do business with BN.

    - Bills of Lading, freight bills, equipment ordering, EFT freight payments, and purchase orders are supported EDI applications, plus electronic mail, rate inquiries, and shipment tracing services.

    - Thirty customers transmit bills of lading representing 4,000 monthly transactions.

    - The company has established an EDI management team with representation from accounting, operations, marketing, IS, and purchasing for setting up internal EDI policies and standards.

    - BN is considering opening its large private network to local dial-in access by its customers or providing access through third-party network service providers.

  - BN is installing a front-end system capable of receiving and distributing any EDI transaction for appropriate action.

  - As an EDI user, BN has the Electronic Purchase Order system which handled 54,000 transactions with 73 vendors in 1986.

- Union Pacific offers the "Streamliner" EDI service to customers through its Transportation Control System, a customer service installation used by service representatives, but also accessible by customers' computers for certain applications.

  - Services supported include Autobill (for bills of lading covering frequent shipments to regular destinations), FRTBill (which transmits bills and statements), Corporate Trade Payments (which authorizes a shipper's bank to pay bills), and logistics information.

  - The company provides UPINFO PC software which provides a fleet car tracing capability. Other features are being added.

- Major railroads are encouraging the EDI market by requiring shippers to use electronic bills of lading by a certain date. Conrail has established 1988 as that date, but meanwhile it has told shippers that if they use EDI now, their shipping bill will be discounted.

- As with other forms of transportation, the railroad industry is an important EDI participant because it deals with virtually all industries.

- Although several companies provide information services to the rail industry, Kleinschmidt appears to be the leader in EDI, although Railinc, a subsidiary of an industry association, and TranSettlements also provide services. The companion report, EDI Service Provider Profiles, has more information on these companies.

b. Trucking

- The trucking sector is the most fragmented in the transportation industry. Its thousands of firms vary from single owner/operator shops to nationwide, long-haul carriers.

- Severe competition and business failures have resulted from the 1980 deregulation under the Congressional Motor Carrier Act. It abolished minimum rates for shipping. The largest nationwide trucking companies have used low pricing to drive smaller companies out of business.

- Trucking sector revenue growth has also been eroded by price cutting competition between union and nonunion carriers.

- Many unionized carriers have established nonunion subsidiaries to compete for "less than truckload" business creating needs for complex billing, tracing, and detail operations. When linked to EDI applications, these operations create needed efficiencies.

- Although the transportation industry pioneered EDI, trucking companies have been slow to use it due to financial constraints and a lack of computerization.

  - This is being overcome with less expensive computer systems.

  - According to an American Trucking Association survey, approximately 60 trucking firms have EDI capabilities within their information systems; however, INPUT believes several hundred firms are at least evaluating EDI, if not in fact using it.

- Trucking companies that have implemented EDI see it and other technology applications as a market differentiator which improves customer service.

- For example, PIE Nationwide (Jacksonville, FL) supports mainframe-to-mainframe EDI access through it Shipment Tracking and Reporting - Total Responsibility and Control (STAR-TRAC) system. Billings, payments, claims, and adjustment information can be exchanged through the system.

- Consolidated Freightways has been using EDI for approximately seven years through its Portland (OR) data center.

- Coles Express (Bangor, ME) has EDI capabilities in its Motor Carrier Information System, which can additionally provide access through a voice response system.

- TranSettlements is the leading third-party EDI service provider to the motor transportation subsegment.

- Capacity Exchange Inc. (CAPEX, Grand Rapids, MI) is offering an electronic trading service for spot-market generic truckload services.

  - Using a system modeled after a commodity exchange, motor carriers can bid on truckload shipments as required by shippers.

  - The system can be accessed through a PC or handled by a service representative.

c. Ocean Shipping

- Most of the paperwork in this industry is transferred between shippers and forwarders.

- Shippers have not been agressive advocates for EDI, but carriers are beginning to recognize that the benefits are worth pursuing.

- Many shipping companies provide on-line services for rate quotes, freight bills, manifests, trace shipments, and billing. Some support data analyses for management reports.

- Ocean and other forms of international shipping become important EDI participants because they deal with customs, port authorities, as well as shippers in various industries.

- The U.S. Customs Service, which controls cargo movement through U.S. ports, is promoting electronic exchanges in the shipping industry.

  - Customs paperwork has doubled since 1976 to approximately 6.8 million entries per year, while staffing levels have remained constant.

  - The agency's Automated Broker Inferface program expects half the nation's entries on the system by the end of 1987.

  - The key customer benefit is moving shipments through customs in hours rather than days.

  - The benefits to port authorities will be efficiencies in facility use and a competitive edge for automated ports over those maintaining paper processing.

- The Shipping Industries Processing System (SHIPS), acquired by Wilships, Ltd, a joint venture between Turnkey & Applied Computing Systems Ltd. (London) and Wildata A/S (Norway), is now being marketed in the U.S.

  - Wilships, Inc. (Gaithersburg, MD) is the U.S. subsidiary of the venture.

  - SHIPS enables steamship agencies, freight forwarders, shippers, importers, and customs brokers to automate all import and export data.

- SHIPS can be accessed on-line through General Electric Information Services Company's value-added network.

- EDI in these industries is summarized in Exhibit IV-6.

4. MEDICAL PRODUCTS AND SERVICES

- The medical industry's EDI involvement encompasses pharmaceuticals, medical supplies, and transactions related to insurance and government reporting requirements. Healthcare claims processing is discussed in this chapter, Section 6.

a. Pharmaceuticals

- In the early 1970s, drug wholesalers began supplying pharmacists with hand-held terminals to collect and transmit orders. Currently, over 90% of drug wholesalers use this method; some even refuse to accept paper purchase orders due to their inherent inefficiencies.

- The drug wholesaling business traces its EDI involvement to 1972 when the National Wholesale Druggists' Association (NWDA) helped establish Ordernet services supplied by what was then Informatics General (now Sterling Software). Ordernet handles the electronic transmission of purchase orders to drug suppliers.

- Due to the early date of its involvement, industry-specific standards, called Ordernet, were developed.

- EDI activity has grown in the subsequent years, driven in part by the industry's complexity. Wholesalers may deal with over 1,000 individual suppliers on a regular basis.

EXHIBIT IV-6

## EDI IN TRANSPORTATION

| SEGMENT | ACTIVITY SUMMARY |
|---|---|
| Rails | Large Companies Using Private Systems, Industry Association RCS, and Kleinschmidt |
| Trucking | 60-200 Firms Using EDI |
| Ocean | U.S. Customs Promoting EDI to Cut Paperwork |

- Today, approximately 80% of the purchase order dollar volume is handled electronically; however, in terms of purchase order volume, only 20% are handled electronically.

- The reasons for this relatively low penetration level are:

  - Success with large wholesalers mitigated interest in involving small suppliers.

  - Small suppliers are less likely to be computerized.

  - Since pharmaceuticals are not central to their business, some suppliers do not support the Ordernet standards.

- Starting in 1983, drug wholesalers started selling directly to hospital pharmacies in response to hospitals' needs to cut costs. One of the primary applications requiring an electronic solution was the chargeback mechanism or rebates from drug manufacturers. Three chargeback electronic formats were developed:

  - Bid award notification from manufacturers to drug wholesalers.

  - Chargebacks or rebate claims from wholesalers to suppliers.

  - Chargeback reconciliation used by manufacturers to explain why certain claims are not being accepted.

- To date, only the first format is being used in volume.

- In 1985, a major drug supplier required wholesalers to use electronic funds transfer as a condition of doing business.

- This mandate did not consider industry input to how EFT should be handled.

- In response, the NWDA, working with other health care associations and with wholesalers, manufacturers, and experts in finance, information systems, marketing, and customer service, began investigating expansion of its EDI experience to cover other forms of business transactions.

- The goal is to develop a single EDI standard for the entire health care industry and not just for drug distributors.

- These activities are also important because drug distributors sell not only to health care industries but to the grocery and mass merchandising industries which have different EDI standards than the industry-specific approach taken by pharmaceutical concerns to date.

- The task force approach is leading to ANSI X12 and UCS format support for future transactions, which Sterling Software will support. The Health Industry Distributors Association (HIDA) is also developing ANSI X12 formats to cover chargeback and contract awards association.

- Additionally, the Health Industry Bar Code Council (HIBCC) is working to coordinate ANSI X12 formatted EDI use in the entire health care industry. The involvement of this council is similiar to the bar code/EDI relationship found in the grocery industry, paper and office products, and automotive manufacturing.

- The most active third-party EDI service providers remain Sterling Software's Ordernet (claiming 80% of the wholesale industry's EDI transactions), McDonnell Douglas' EDI-Net, and GEISCO's EDI*Express.

- GEISCO has established a relationship with a start-up firm called Distribu*Net (Dania, FL) to distribute that company's data base of generic drug information to pharmacists and to provide buying and selling capabilities through the EDI service.

- Some aspects of pharmaceutical distribution apply to the retail distribution sector, as discussed below in Section 5.

b. Medical Supplies

- The best known EDI implementations in this industry are captive systems.

- American Hospital Supply (AHS), a manufacturer and distributor of medical equipment, offers the ASAP (Analytical Systems Automated Purchasing) private EDI system, which allows customers to uses terminals, touch-tone phones, portable terminals, bar code scanners, and processors of all sizes to enter orders.

  - Over 500,0000 products are available to some 5,000 customers.

  - Messages and special requests can be sent to customer sales representatives.

  - The system can translate between a customer's stock numbers and AHS's order numbers and can provide documentation sorting and customized management reports.

  - Optionally, the system can automate ordering with the ASAP computer, compiling a list of recommended purchases for electronic approval.

  - ASAP is extended to American Hospital Supply's own suppliers.

- ASAP saves AHS an estimated $6 million annually and is credited with helping it achieve market dominance.

- AHS is expanding ASAP, permitting hospitals to order from other suppliers.

c. Optometry

- This health care sector shares common characteristics with retail distribution, but due to the professional nature of its practictioners is included here.

- Independent optometrists, facing market share decline to chain practices, are using the Total Ophthalmic Professional (TOP) network developed by a group of practictioners led by Associated Optical Labortories (Dallas, TX).

- With approximately 225 subscribers, the TOP system accepts eyeglass and contact lens orders for overnight delivery to compete with large chain delivery capabilities.

- The network also provides additional professionally-oriented applications:

  - Patient records systems.

  - Accounting.

  - Customized newsletters, reminders, and promotional mailings.

  - A discount buying service is planned.

- These services will be provided to customers placing $2,000 in orders monthly.

- Difficulties facing TOPS and similiar on-line order entry systems being developed by other optical laboratories are resistance within the profession to

computerization and cost concerns related to purchasing hardware and training how to use it. Also, since TOP is sponsored by an individual optical laboratory, there is reluctance to be dependent on one supplier.

- TOPS is a captive on-line order entry system rather than an EDI implementation, but it illustrates how an interorganizational system can be used to address competitive issues within a specific industry.

- EDI activities in these industries is summarized in Exhibit IV-7.

5. RETAIL/WHOLESALE DISTRIBUTION

- The distribution industry has contracted from approximately 180 firms in the 1970s to about 110 companies.

- The industry is characterized with thin margins, often under 2%.

- To reduce costs and gain competitive advantage, many large distributors such as McKesson Corporation (San Francisco) have implemented private EDI-like systems for both their suppliers and customers.

  - McKesson sees its use of technology as increasing profits and market share, improving efficiency, and locking in customers.

  - The company maintains nearly 3,000 trucks delivering a 100,000 item product line supplied by nearly 6,000 manufactuers to two million customers from 135 distribution centers.

  - Its Economost order entry system was first introduced in 1970 for the Drug and Health Care Group, with later modifications supporting other groups within the company.

EXHIBIT IV-7

## EDI IN MEDICAL PRODUCTS AND SERVICES

| SEGMENT | ACTIVITY SUMMARY |
|---|---|
| Pharmaceuticals | Wholesalers Active for 15 Years; Proprietary Standards Migrating to X12 for Entire Industry |
| Medical Supplies | Captive Systems Best Known: AHS |
| Optometry | TOP Network Helping Independents Compete Against Retail Chains |

- The company was able to reduce its order entry staff from approximately 700 to approximately 20.

- K-Mart Corporation (Troy, MI) has been using EDI since 1976 and now has over 800 suppliers and transporation carriers on its system using standards which predate X12. The company also supports UCS standards and will adopt X12 in the future.

- EDI use within distribution-intensive industries varies by segment, as discussed below.

a. Grocery Industry

- The industry has quickly adopted advances in technology, right down to the checkstand, as a way of optimizing profit margins measured in fractional percentages.

- Industry buyers issue some 15 million purchase orders annually. These documents trigger a like number of bills of lading and invoices, along with other documents such as adjustments, product announcements, allowances, and other information.

- The total of this traffic is estimated in excess of 100 million messages between 2,000 distributors, 5,000 manufacturers, and 2,000 brokers. Accordingly, industry participants view the grocery and distribution industries as prime candidates for EDI services.

- The grocery industry has been gradually adopting EDI services after a consulting firm predicted in 1981 that the industry could save between $196 million and $324 million if only half of all transactions were done electronically.

- The Uniform Product Council, the agency behind adoption of bar code standards, is the principal industry EDI coordinator through the Uniform Code Council (UCC). Its efforts have resulted in the Uniform Communications Standard (UCS).

  - UCS standards are based on earlier EDI standards developed by the transportation industry.

  - Participating companies purchase UC communications identifications from the UCC for a one-time charge ranging between $500 and $10,000, based on the company's annual revenues. These funds are used for management and administrative services provided by the UCC.

- Currently, purchase orders and invoices represent the bulk of UCS exchanges.

  - New standards have been added supporting the industry's Direct Store Delivery, multi-point purchase orders, and other requirements.

  - Industry participants report that while most users send and receive electronic purchase orders, they print UCS invoices used for manual keying procedures. Although the optimal benefits of EDI are not realized, the use of tailored print formats does lead to productivity gains in keying operations.

- UCS services are available through McDonnell Douglass' EDI-Net, GEISCO's Mark-Net, Sterling Software's Ordernet Division, and thorough proprietary networks. Western Union has indicated it may target this industry with its EDI service scheduled for introduction in third quarter 1987.

- Sterling Software's Ordernet was endorsed in 1984 by the National American Wholesale Grocers Association (NAWGA) to support UCS. Grocery wholesalers typically use micros to send UCS-formatted information to suppliers.

- General Foods, which began with UCS in December 1982, now uses EDI with approximately 150 customers, representing 21% of its national case volume for dryline and frozen foods.

- General Mills has set up an EDI network to link supermarkets with the company for invoicing.

  - The company has a private network from its headquarters to plants and sales offices; however, this was deemed unsuitable for EDI.

  - Tymnet was contracted to provide EDI networking services. Twice daily, General Mills' computers send out invoices which are converted to the UCS format by Tymnet before delivery to supermarkets.

  - Enhancements include using the network to distribute other information to supermarkets such as upcoming promotions and ad campaigns details.

b. Office Products

- The Industry Committee on Office Product Standards (ICOPS) is a joint project of the National Office Products Association and the Wholesale Stationers' Association.

  - EDI research began in 1983 and EDI piloting began in 1985 using GEISCO and X12 standards, with additional data elements for specific industry needs.

  - ICOPS has endorsed GEISCO's network for its EDI activities.

  - Compliance with ICOPS is voluntary.

- ICOPS representatives report the pilot was successfully completed in late 1986 and that currently 40 manufacturers, dealers, and wholesalers are using the system.

- They see future impetus for EDI growth in their sector coming from major end users of office products (which includes virtually every industry), mass retailers, and through government-sponsored electronic procurement programs.

c. Warehousing

- The Warehouse Information Network Standard (WINS) was developed by the public warehouse industry, defining transactions to and from depositors such as frozen food manufacturers. WINS is similiar to the UCS standard.

- It is estimated that 200 warehouse locations will be using WINS transactions by the end of 1987.

- EDI activities in distribution are summarized in Exhibit IV-8.

6. SERVICES

a. Health Claims Processing

- In addition to supporting the electronic exchanges of business documents for buying and selling transactions, EDI is used for submitting claims to health insurance carriers, using electronic versions of formats developed in support of Medicare claims processing.

- Such services are provided by the National Electronic Information Corporation (NEIC), a clearinghouse for several insurance carriers, General Electric Information Services Company (which markets NEIC services), and several others.

EXHIBIT IV-8

## EDI IN DISTRIBUTION

| SEGMENT | ACTIVITY SUMMARY |
|---|---|
| General | Large Distributors and Mass Merchandisers (McKesson, K-Mart) Using Private Networks |
| Groceries | UCS Used by Most Large Firms |
| Office Products | Industry Association Project (ICOPS) Used by 40 Wholesalers, Large Dealers, and Manufacturers |
| Warehousing | WINS Standard is Similar to UCS |

- The potential for health claims processing becoming a major EDI application is significant.

  - The health care industry is addressing cost containment in response to government, business, and consumer pressures. The average corporation spends $1,000 per employee annually for health care and an additional $80 for health care claims administration.

  - An estimated three billion paper-based medical claims are mailed each year, involving over 500,000 physicians and hundreds of insurance carriers. These documents lead to additional transactions such as remittance advices and benefits coordination between multiple carriers.

  - In addition to physicians, there are over 100,000 dentists, 60,000 pharmacies, 6,000 hospitals, plus nursing homes, alternative health care providers, and suppliers of medical equipment which represent the potential user market.

- The Health Care Financing Administration (HCFA), which is responsible for the U.S. Medicare program, is working toward a 1990 goal of having half of all Medicare Part B claims processed electronically.

- Working to increase the use of electronic claim filing is the availability and increasing acceptance of in-house turnkey hospital management systems and remote computing service vendors which automate bill processing and provide automatic links to insurance carriers.

- Also contributing to segment growth is increasing acceptance of practice management systems by health care professionals such as physicians, dentists, pharmacists, and therapists. Additionally, insurers such as Blue Shield have implemented micro-based Electronic Claims Submission (ECS) systems.

- As a measure of segment potential, NEIC officials report a nearly four-fold increase in 1986 volumes over 1985.

- Other firms involved in electronic health claims processing are Physician's Practice Management, with its ClaimsNet service (Indianapolis, IN), APS Systems (San Antonio, TX), ATT Micro Systems (Seattle, WA), Chen Information Systems (San Jose, CA), Cotton Banks, Inc. (Tulsa, OK), Fisher Business Systems (Atlanta, GA), Medaphis Corporation (Atlanta, GA), Micro-Medics Corporation (New Rochelle, NY), Ohio Medical Indemity Mutual Corporation (Worthington, OR), PC Healthcare (Eugene, OR), Systems Plus Corporation (Mountain View, CA), and Script Form, Inc. (Fort Lee, NJ).

b. Insurance

- The best known example of EDI for insurance underwriting services is provided through IBM's Information Network (IIN). Insurance Value Added Network Service, Inc. (IVANS), which uses IIN, is profiled in EDI Service Provider Profiles.

- Contrasting with EDI for purchase orders and invoices, EDI in insurance is more textual than numerical. It is being used between independent property and casualty agents and their multiple insurance carriers since companies with their own agents use captive systems.

- However, as the IVANS profile further describes, there are problems in developing independent insurance agents as EDI customers.

  - Independent agents are less likely to be computerized. Accordingly, mid- to large-size companies would be best candidates, at least in the near term.

- There are technological and training issues to overcome, in part due to the geographic distribution of independent agents.

- Procedures and standards among insurance companies are not standardized.

- The Insurance Institute for Research (IIR - White Plains, NY), which established the IVANS subsidiary and service, is addressing these issues. IIR is developing a better electronic interface between independent agencies and multiple insurance companies. This research and development project is called Project Impact.

c. Courier Services

- Several overnight package delivery firms have installed EDI and EDI-like systems to improve customer service.

- For ten years, Emery Worldwide has provided electronic billing and remittance (EBR), a paperless and centralized process for invoice handling and accounts payable transactions. EBR is designed for high-volume users.

  - TDCC air-industry standards or customized formats are used for electronic billing.

  - ANSI X12, Automated Clearing House and proprietary formats are used for remittance advice.

- Emery also has a PC support program to automatically create shipping labels, manifests, reports, and invoices and helps consolidate shipments.

  - These services, known collectively as Value-Plus, give customers financial management controls, cost analysis, and enhanced chargeback capabilities.

- Other courier services have similiar systems in place or under development.

7. FINANCIAL SERVICES

- In a survey of 193 banking executives conducted for INPUT's recent multi-client study Banking and Financial Services: The Next Decade, 55% reported current or planned EDI projects, with regional and money center banks reporting highest levels of involvement or planning, as shown in Exhibit IV-9.

- Several banks have services which can be linked to EDI, and others are investigating further participation as service providers.

  - The First National Bank of Chicago (discussed in Chapter V) is the most active in providing EDI services.

  - First Chicago's experience as an EDI helped it develop its services.

- Several other banks are EDI users in their trading relationships for supplies, equipment, and services. The market segment expenditures shown in Chapter VI reflect this involvement.

8. TAX RETURNS

- In 1986, the Internal Revenue Service initiated a test of an electronic filing system designed to reduce the paperwork involved in filing personal tax returns. Business returns were added to the test in 1987.

  - The test program for personal returns is called Study of the Utility of Processing Electronic Returns (SUPER) and is handled through the IRS' Cincinatti (OH) Service Center.

EXHIBIT IV-9

## CURRENT/PLANNED EDI IMPLEMENTATION BY BANKS

| BANK TYPE | SAMPLE SIZE | EFT | EDI |
|---|---|---|---|
| Independent | 17 | 71% | 24% |
| Large Independent | 19 | 58% | 53% |
| Regional | 48 | 77% | 65% |
| Money Center | 5 | 80% | 80% |
| Total | 89 | 72% | 55% |

- SUPERB (for business returns) is being run through the Andover (MA) service center, processing forms 1041 and 1065.

- Six tax preparation firms serve as hubs, providing bisynch communications and software linking into the IRS' communications processor supplied by Mitron Systrems Corporation (Columbia, MD).

  - Some 58 additional agents feed returns to these six.

  - Personal electronic return filing is currently limited to taxpapers with fairly simple returns.

- Eighteen tax services, banks, and accounting firms transmit business tax forms as agents for corporations.

- Approximately 26,000 personal returns were filed in 1986, with a substantially lower error rate reported than for paper-filed returns.

  - The IRS says it can handle 150,000 personal filings. Approximately 78,000 1987 returns were filed electronically.

  - Electronic filing was first tested for personal returns in three markets--Phoeniz (AZ), Cincinnati, (OH), and Raleigh-Durham (NC).

  - 1987 expansion added Albany-Schnectady-Troy (NY), Sacramento-Stockton (CA), and Norfolk-Virginia Beach-Newport News (VA) for a total of seven markets.

- Also being tested is direct deposit of tax refund checks into taxpayers' designated bank accounts to enhance the benefit and popularity of electronic filing.

- H&R Block is participating with a commercialized service called Rapid Refund, introduced in 1986. It is available to taxpayers regardless of who prepared the return. Electronic returns are filed through the Sears Financial Network using 2780/3780 bisynch communications protocols.

  - It should be noted that although Compuserve is owned by H&R Block, its network is not used by the tax preparation firm.

  - Many H&R Block offices are located within Sears' retail Financial Centers. Sears' SNA network supports the entire corporation with capacity to spare.

- Other firms serving as hubs for electronic personal return filing are Speed-S Electronic Delivery Company (Minneapolis, MN), FastTax (Carollton, TX), Beneficial Management Services (Peapack, NJ), Chartain Accountancy Corporation (Belmont, CA), and Reliable Tax Service (Dayton, OH).

- Agents charge up to $25 to electronically transmit a personal tax return to the IRS if the return is prepared by the filers.

- Business filers can ship magnetic tape to the Andover processing center or use electronic transmission into the IRS' MITRON network.

  - The method depends on the number of attachments.

  - Some companies attach up to 500,000 forms, which would not be cost-effective to electronically transmit.

- The IRS is projecting that eventually both businesses and individuals will be able to file their returns electronically, improving efficiency and reducing errors.

- Currently, the bulk of electronically-filed returns is from consumers and, therefore, does not fit the strictest definition of EDI. If it did, electronic filing would result in approximately $2-3 million in "end-user" expenditures.

- As more businesses move to this method, electronic tax filing, along with other forms of business to government reporting, could become more of a factor in business-oriented EDI.

- EDI activities in service industries is summarized in Exhibit IV-10.

9. FEDERAL GOVERNMENT EDI INVOLVEMENT

- In addition to the IRS' electronic income tax filing program and HCFA's role in establishing formats for medical claims submissions, several federal government agencies have initiated EDI and EDI-like projects.

  - The General Services Administration has issued an RFP for translation software and network services to support an X12 pilot project for furniture procurement.

  - The Veterans Administration is using EDI for its purchasing requirements.

  - Customs agencies are automating their port information processes, with international EDI components likely.

  - Other departments, such as Agriculture and Defense have expressed interest in EDI. For example, U.S. Army and Air Force commissaries are moving toward EDI in support of procurement activities.

- While it is unlikely federal government agencies will require suppliers (especially smaller ones) to use EDI, it is expected that large contracts, particularly in defense and aerospace, will contain language suggesting EDI use as a means of controlling and monitoring costs.

EXHIBIT IV-10

## EDI IN SERVICES

| SEGMENT | ACTIVITY SUMMARY |
|---|---|
| Health Claims | UB 82 and HCFA Formats; Growing Usage |
| Insurance | Industry Association Improving Interface/ Methods between Independent Agents and Carriers |
| Overnight Couriers | EDI Used to Improve Customer Service to High-Volume Users |
| Banks | Growing Interest as Users, Uncertainty as Service Providers |
| Tax Preparation | First Year of Business Electronic Filing Test; Second Year of Personal Returns Test |

- The involvement of the federal government in EDI will be significant due to its influence across many industry segments.

- EDI in the federal government is summarized in Exhibit IV-11.

- INPUT is preparing a separate report on federal government EDI initiatives for publication in late 1987.

## C. COMMENTS ON INDUSTRY SECTOR EDI ACTIVITIES

- Approximately 25 industries are now involved in EDI.

- With some exceptions, most industries are adopting X12 standards, using third-party service providers as necessary for translations to overcome any format differences when trading crosses industry boundaries.

- While the EDI champion in some industries has been dominant firms requiring their suppliers to use EDI, most of the more recent industry entrants work through task forces or industry associations to address common issues and develop a uniform approach.

- The next chapter examines the future of EDI services, identifying opportunities for service providers and users. The chapter contains recommendations and concludes the study.

EXHIBIT IV-11

## EDI IN FEDERAL AGENCIES

- GSA, VA, Customs, Defense Agencies Are All Moving to EDI in Procurement
- Large Defense/Aerospace Contracts Require EDI Capabilities to Control/ Monitor Costs

# V FORECASTS, OBSERVATIONS, RECOMMENDATIONS, AND CONCLUSIONS

# V FORECASTS, OBSERVATIONS, RECOMMENDATIONS, AND CONCLUSIONS

## A. MARKET FORECASTS

### 1. OVERALL GROWTH

- Electronic methods will account for a substantial portion of large corporation business transactions by the end of the forecast period.

- For the first time since 1969 when EDI was initially proposed, there is a confluence of factors which indicate EDI growth will be exponential. These factors include the proliferation of computer systems, accelerated third-party marketing and growing recognition of the benefits of EDI.

### 2. AGGREGATE MARKET GROWTH

- The EDI market can be examined as the sum of its components. These components are:

  - Network services, including access point maintenance, error correction, protocol and speed conversions, switching, internetworking through gateways, and store and forward services. These services are typically provided by value-added networks, although private networks may provide many, if not all, elements.

- Processing services includes data field validation, data format translations, standards conversions, and directing electronic transactions submitted electronically in a pseudo-batch mode (i.e., messages for many addresses transmitted together) to their individual destinations.

  . These services may be provided by the processing affiliates of VANs and by RCS firms, but individual functions, such as translations, can be performed by the trading partners.

  . EDI-related processing services include reports generated from traffic and consolidation reports.

- Software for translating data between EDI standards and to handle communications and communications software associated with EDI transmissions.

- Professional services for systems design, software customization, equipment selection and acquisition, systems integration, facilities management, education, and training.

- Aggregated market growth projections are shown in Exhibit V-1 representing an 88% average annual growth rate (AAGR) through 1992.

- A breakout of 1986 EDI market components is shown in Exhibit V-2.

3. INDUSTRY SEGMENT GROWTH RATES

- Exhibit V-3 shows INPUT's industry segment market forecasts.

- For comparative purposes, the exhibit also shows INPUT's breakout of industry sector processing/network services use by percentage.

EXHIBIT V-1

## EDI MARKET FORECAST

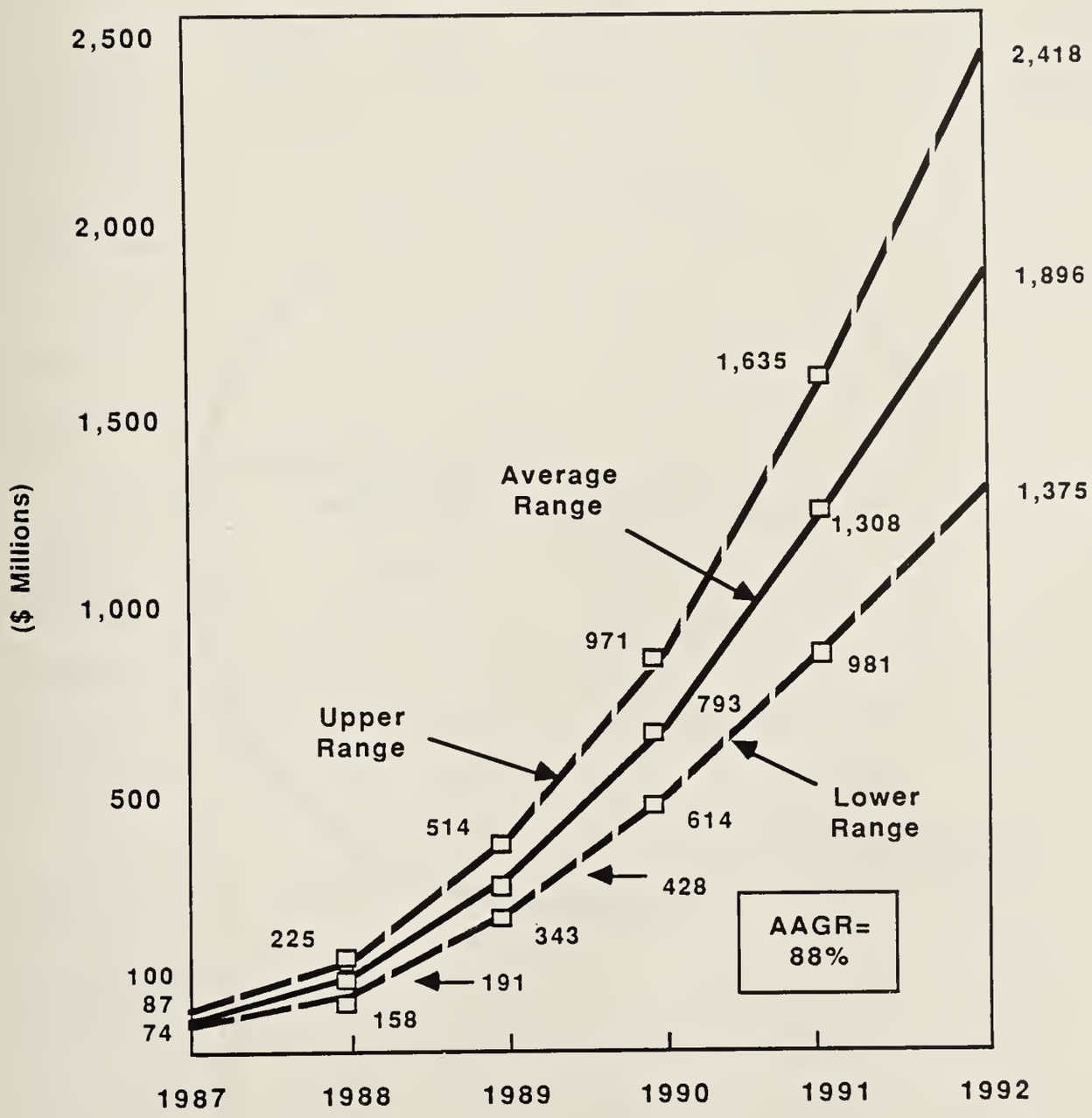


EXHIBIT V-2

## EDI MARKET COMPONENTS
## 1986

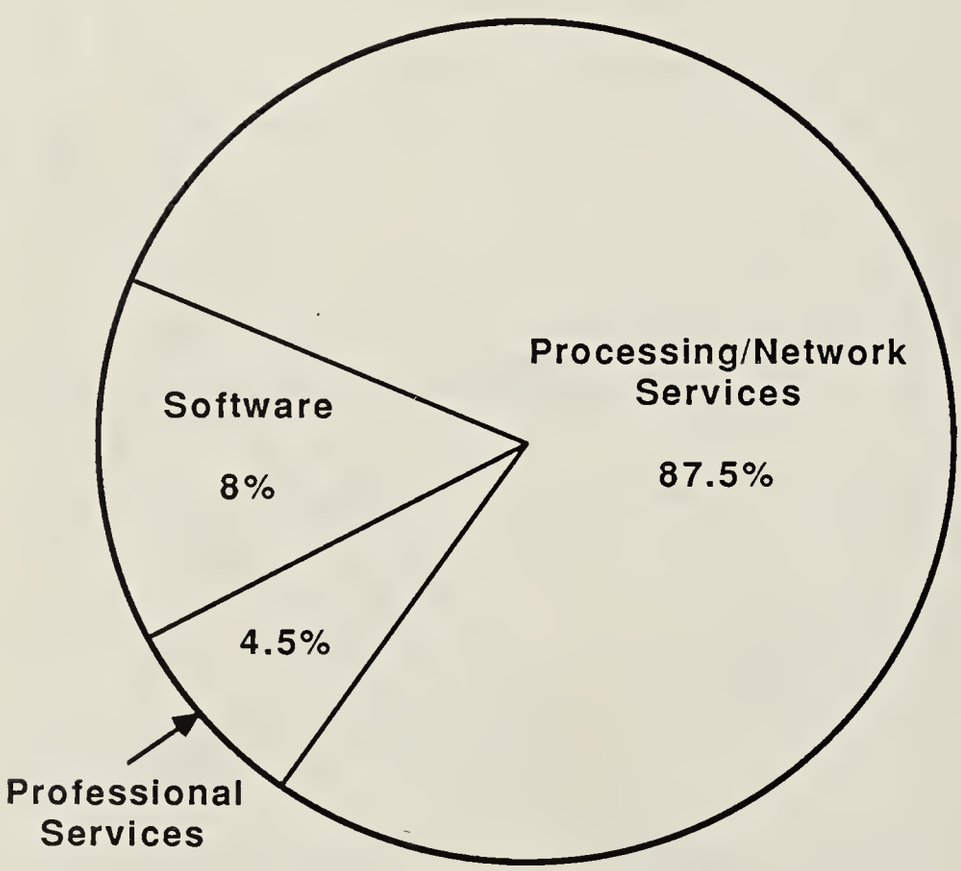


EXHIBIT V-3

## INDUSTRY SEGMENT EDI EXPENDITURES

| Industry Segment | Percent of EDI Market | Percent 1986 Proc/Net | ($M) 1986 EDI Value (from mean) | Percent of EDI Market | Percent 1992 Proc/Net | ($M) 1992 EDI Value (from mean) |
|---|---|---|---|---|---|---|
| Discrete Manufacturing | 26 | 7.2 | 11.96 | 17 | 9.1 | 322.38 |
| Process Manufacturing | 12 | 8.7 | 5.52 | 21 | 8.4 | 398.23 |
| Transportation | 9.5 | 2.4 | 4.37 | 18 | 2.6 | 341.34 |
| Utilities | 1 | 1.4 | 0.46 | 0.5 | 1 | 9.49 |
| Telecommunications | 0.5 | 4.6 | 0.23 | 2 | 5.5 | 37.93 |
| Distribution | 18 | 10.3 | 8.28 | 19 | 10 | 360.30 |
| Banking/ Financial Services | 1.8 | 0.3 | 0.83 | 8.2 | 31.7 | 155.50 |
| Insurance | 5.6 | 4 | 2.58 | 4 | 3.5 | 75.85 |
| Medical | 12 | 8.2 | 6.21 | 5.3 | 9.1 | 100.51 |
| Education | - | 1.3 | - | 0.1 | 1.1 | 1.90 |
| Services | - | 11.3 | 0.64 | 2 | 10.3 | 37.93 |
| Federal Government | 0.1 | 0.8 | 0.05 | 0.8 | 0.6 | 15.17 |
| State/Local Government | - | 1.5 | - | 0.3 | 2 | 5.69 |
| Other | - | 6.4 | 4.88 | 1.8 | 5.2 | 34.13 |
| Total (=100%) | 100 | 100 | 46.00 | 100 | 100 | 1,896.33 |

EUPD1

## 4. THE "CASCADE" AND "DOMINO" EFFECT - IMPACT ON VOLUME

- It is estimated that 25 billion business documents are sent through the U.S. mails annually. This represents the potential number of EDI transactions; however, only a portion will ever be handled electronically.

- Network planners should be aware of a possible "cascade effect" leading to exponential EDI transaction growth within a relatively short period of time.

- Currently, EDI system users are piloting a few transaction sets. When extended, each exchange could require as many as 12, and, potentially more, electronic transactions:

  - A request for information requires a response.

  - A request for bid leads to a bid, acknowledgement of the bid, and an award.

  - A purchase order leads to a confirmation which leads to a shipping notice and invoice.

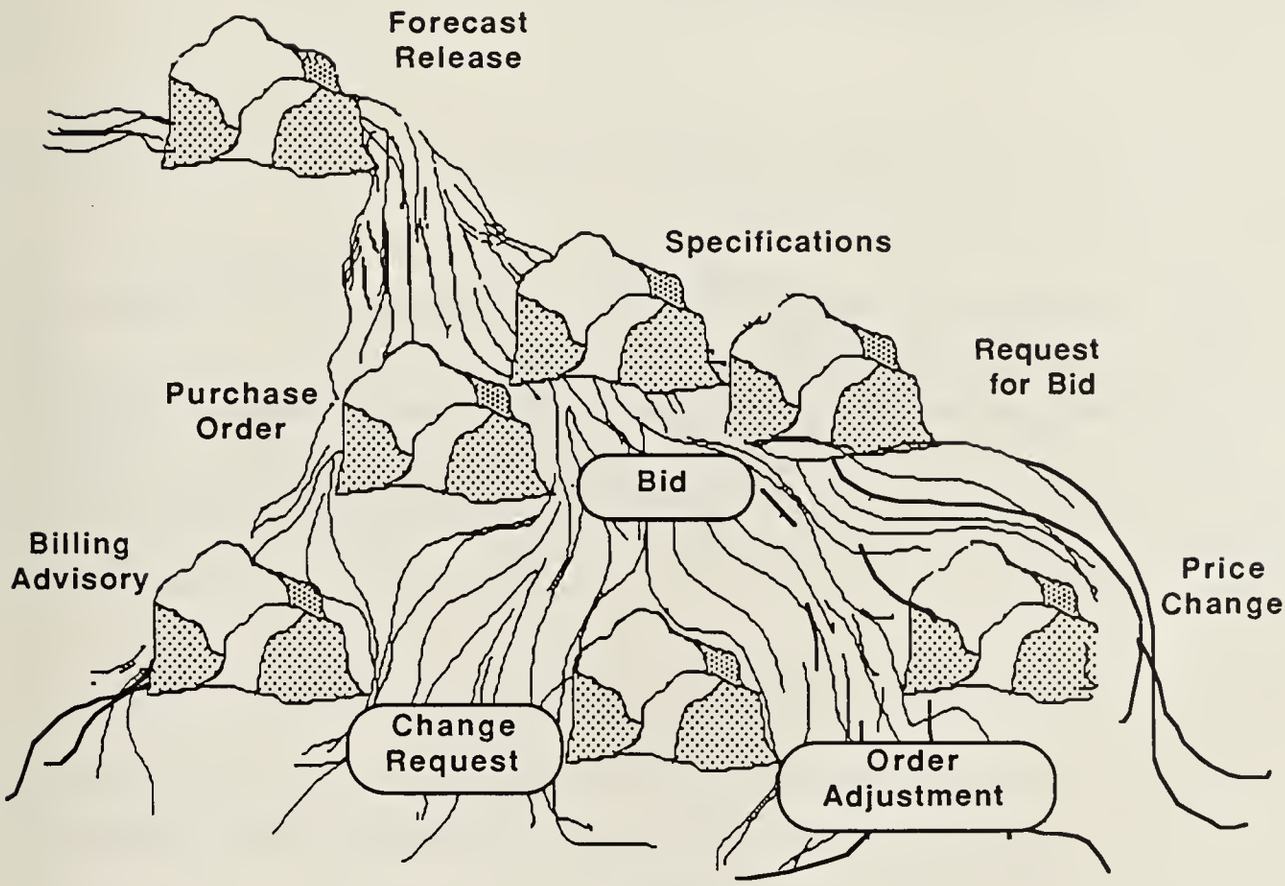
- However, some observers believe the cascade effect may be more pronounced in small organizations where there is a close bridge between applications. In larger companies with more diversity and less linkage between departments (and applications), the effect may be delayed since one department may implement EDI while others would not immediately do so.

- Exhibit V-4 illustrates the "cascade effect."

- If the cascade effect occurs, it could lead to network congestion and reduced response times. Accordingly, network planners need to review current capacity and project needs based on the intentions of large network users.

EXHIBIT V-4

## THE CASCADE EFFECT



- In addition to the cascade effect, is the "domino" effect. Large users at the center of a trading cluster may coerce their business partners to adopt EDI as a condition of continued business with these suppliers also requiring EDI from the third tier of the distribution chain. This is found most clearly in the auto industry; however, companies in other industries are also adopting mandating EDI.

## B. FORECAST RECONCILIATION

- Exhibit V-5 shows the differences between the current medium range forecast and INPUT's 1985 EDI forecast.

- The 1985 overall market size was overstated due to misunderstanding the nature of several large, private EDI implementations. Initially, these were thought to involve more third-party expenditures than was actually the case.

- The growth rate through the first several years remains high due to several factors:

  - The market is starting from a relatively small base.

  - Use is expected to grow as experience grows. Additional transactions by currently participating users and new use by their trading partners will account for this growth.

  - Early private EDI implementations are expected to become either fully open or have gateways between private to public services, placing more user expenditures in the available noncaptive market.

  - Integrated EDI software from several major mainframe software vendors and EDI add-on modules from secondary sources will become increasingly available, further fueling use.

EXHIBIT V-5

# EDI FORECAST RECONCILIATION

| 1986 MARKET | | | 1990 MARKET | | | 1985-1990 AAGR Forecast in 1986 Report | 1987-1992 AAGR Forecast in 1987 Report |
|---|---|---|---|---|---|---|---|
| ($M) 1986 Report | ($M) 1987 Forecast | Variance as Percent of 1987 Forecast | ($M) 1986 Report | ($M) 1987 Forecast | Variance as Percent of 1987 Forecast | | |
| 12 | 46 | -25.8 | 1,149 | 793 | -31 | 98% | 88% |

EUPD1

- User expenditures will tend to moderate somewhat in the middle years of the forecast even though transaction growth will continue at high rates.

  - Competition among vendors will lead to price cuts, reducing user expenditures.

  - Discounting will follow higher volume transactions.

  - Value-added services such as EDI data bases may be slow to develop, thus contributing less substantially to the overall market.

  - There will tend to be a pause as users evaluate their progress in the forecast's middle years before spending restarts as the market moves toward saturation.

- Resizing the current market results in more dramatic changes at the end of the forecast period than a slowly growing market would experience, but it must be remembered that EDI is still expected to grow rapidly.

## C. MARKET OBSERVATIONS

- Users are being required to adopt new ways of looking at information flows, to recognize the value of information and acknowledge the competitive advantages EDI can provide.

- However, private EDI networks may work to retard the market by slowing acceptance of standards, limiting trading relationships, and excluding potential participants.

## I. VANS HAVE THE MOST TO GAIN

- INPUT believes VANs are best positioned to benefit from EDI growth due to the following factors:

  - VAN networks are virtually omnipresent, cost-effective communications links.

  - VANs and their processing affiliates serve many of the industries now engaged in EDI.

  - VANs generally have mature, widely dispersed marketing organizations.

  - VANS offer international capabilities through their own overseas presence or through arrangements with foreign networks and International Record Carriers (IRCs).

  - Several VANs currently offer EDI services which have been endorsed by industry associations, and they will capitalize on their product development leads.

- VANs will experience significant EDI growth through 1992. The relatively slow growth in past years is partly due to the recent introduction and promotion of EDI services by several vendors, a lack of awareness, and the high costs of implementation which are now moderating.

- Due to initial low volume, heavy start-up, market education, and sales costs, INPUT projects that VAN/EDI profitability will be reached by recent market entrants three to four years after service introduction.

2. RCS FIRMS WILL HOLD NICHES

- Small RCS firms will continue to hold niche positions in industries currently served, such as rails and trucking, but will feel pressure from larger competitors, VANs, and private systems. Acquisitions are possible.

- While more successful, larger RCS firms need to address networking issues (if they have not already done so) to insure EDI availability on a cost-effective, error-free basis from a wide geographical area.

3. EDI CREATES OPPORTUNITIES

- Growing use of EDI will lead to increased opportunities for professional services firms as well as hardware, software, turnkey, and communications vendors.

- Smaller companies need to be included in EDI services as they often create more expense in suppliers' order processing than larger companies, in relationship to order size.

- More micros and communications equipment/software will be needed by smaller companies to take advantage of EDI services and to meet the requirements of major trading partners for suppliers with EDI capabilities. The growth of microcomputers for EDI implies increasing demand for micro-EDI software.

- Many users will need professional services to customize EDI software and integrate systems. External assistance is needed due to the applications backlog at many user locations.

- Several industry associations have issued RFPs on behalf of their members, using professional services firms to evaluate responses and manage implementation. With approximately 25 industries now engaged in EDI, opportunities remain with the rest.

4. EDI IS EMERGING FROM THE PILOTING STAGE

- In many industries, EDI can best be generalized as in the piloting or testing phase.
  - Several individual companies and market segments have gone beyond this stage but use a limited number of transaction types.
  - Few have fully integrated EDI with other applications such as accounting, cash management, inventory control, and shipping-related functions.
- Based on this observation, INPUT believes that while growth will be substantial over the forecast period, optimization by the majority of now active industries will occur late in the forecast period or beyond.

## D. THE FUTURE OF EDI - ENHANCED SERVICES

- Adding value to third-party services will provide advantages to vendors since private EDI systems generally support only transactions. This section describes potential value-added enhancements to EDI.

1. DATA BASES

- Sales forecasts and market analysis based on information transmitted through an EDI system is a potential value-added service enhancement.
  - Sterling Software Ordernet's Medimetrick pharmaceutical data base provides this function.

- New data bases may evolve using other industry-specific transaction statistics.

- Thus far, service providers other than Sterling have been reluctant to offer transaction-based data bases due to customer security concerns. Initiatives in this area will, therefore, likely come from user industry groups; however, third parties can, and should, promote the idea.

- Links between EDI systems and industry-specific data bases is another value-added option. Most VANs already provide data base gateways. Apparel Computer provides such a data base.

- Exhibit V-6 illustates how EDI traffic can form a data base.

2. GRAPHICS

- The merger of videotex or computer-assisted design and manufacturing (CAD/CAM) images and EDI will support design, specification, and blueprint exchanges between trading partners.

- Graphics capabilities in association with EDI will be relevant in several industries, including aerospace, federal government (specifically defense), other manufacturing, and electronics.

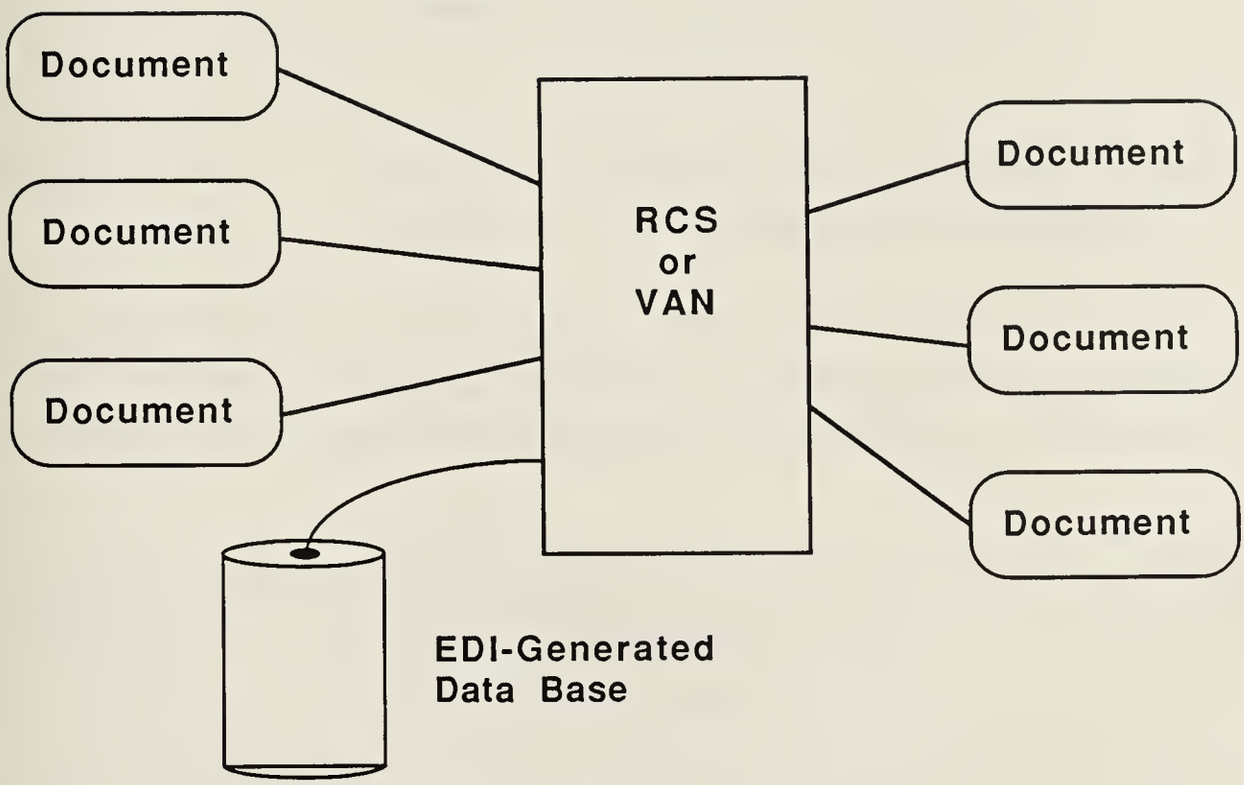
- GEISCO's Design*Net, in the early stages of implementation, has this capability.

- Videolog, Inc. (Norwalk, CT) provides a videotex data base of components to the computer and electronics manufacturing industries, a service resold by at least one electronics distributor.

  - Although not incorporating EDI functionality, it could be implemented by a third-party service provider in association with Videolog.

EXHIBIT V-6

## EDI TRAFFIC BECOMES A DATA BASE



- Texas Instruments, in promoting its electronic components, offers both EDI and Videolog services as examples of technology as a marketing differentiator.

- Working with CAD CAM, Inc. (Dayton, OH), AT&T jointly developed the Wide-Scale Shared Data Operations Management (WSSDOM) system. It is based on the premise that manufacturing operations, particularly purchasing and maintenance support, rely on graphics as much as textual information.

- WSSDOM provides a real-time link between manufacturers and outsourcing suppliers, distributing graphics and text data to support purchasing decisions.

- The service is offered in two versions--an electronic bidding network and one supporting maintenance and repair functions.

  - Supplier Link allows multiple bidding opportunities for small- to medium-sized manufacturers producing speciality parts and components for final assemblies and vertical market product manufacturers.

    . Suppliers pay a fee to build a company profile data base listing production capabilities, industry focus, financial data, and shipping/distribution information.

    . Manufacturers pay use fees when bidding. Bids describe the part or component to be produced, with associated graphics.

    . Suppliers receive bid opportunities through electronic mailboxes.

    . Text and graphic information about the bid may be accessed electronically with zoom and rotate capabilities, or users may print out the information.

- . Bids are collected and transmitted to manufacturers in any format needed. Negotiations between the manufacturer and winning suppliers follows.

- The second service, called Maintenance Link, uses interactive graphics and text data bases to address needs in the replacement part and repair service industries.

  - . Shop mechanics and purchasing agents in repair facilities can share information to expedite the repair process.

  - . An area of a malfunctioning unit can be expanded and rotated, with a bill of materials, parts lists, failure rates, costs, serial numbers, and other information displayed assisting in problem resolution.

  - . The repair facility links with a replacement part distributor and electronic purchase orders are created and transmitted.

  - . The benefits include faster problem identification, reduced costs in parts ordering, reduced catalog maintenance costs, and improved vendor loyality.

- Graphics can be input in the International Graphics Exchange Standard (IGES) using leading CAD/CAM software design files or by supplying hardcopy drafts which can be input by CAD CAM, Inc. using scanners.

- WSSDOM is a marriage of EDI and interactive CAD/CAM designed for companies which cannot invest in the expensive equipment and software necessary for its functions.

## 3. COMPARISON SHOPPING SERVICES

- EDI purchasing functions may be aggregated into comparison shopping services by a clearinghouse.

  - Capacity Exchange Inc. (CAPEX - Grand Rapids, MI) is providing an electronic trading center for spot-market generic truckload motor carrier services.

  - The Computer Dealers and Lessors Association has contracted with Exchange Data, Inc. (Minneapolis, MN) to operate CDLA/Net containing a data base of computer equipment.

    . The service, accessed via an 800-number, Compuserve, or directly, includes relevant data bases (product announcements, legislative updates, company profiles, service directory) and E-mail for exchanging inter-dealer contracts on line.

    . CDLA/Net has approximately 250 users.

  - American Teleprocessing Corporation (Houston, TX) operates a computer exchange network for the American Society of Computer Dealers (with contracts negotiated off-line), a rare coins exchange market, and an electronic telecommunications equipment exchange with approximately 200 users. The company is adding freight companies to the network to handle equipment transfers and the ability to transmit legal documents.

- An EDI comparison clearinghouse will most likely need to function interactively with immediate feedback of product information and pricing and confirmation of order placement. This means a move from current batch methods to on-line transaction processing.

## 4. INTERNETWORKING

- Companies tend to predominantly use one VAN or RCS, hampering cross-industry EDI transfers.

  - Communications are generally limited to companies on the same service.

  - An alternative is to have multiple arrangements, but this requires maintaining several equipment and software settings to accommodate communications on different networks.

  - Depending on volume, it may also require multiple dedicated lines.

- Increasingly, VANs are implementing agreements between themselves and have gateways to other domestic or international packet networks (using X.75 standards) or to International Record Carrier (IRC) networks.

  - IBM's Information Network can be accessed through Telenet.

  - Sterling Software UCS (grocery) traffic can be exchanged with McDonnell Douglas' EDI*Net customers.

  - GE Information Services Company and McDonnell Douglas will interconnect with each other upon customer request.

- Such connections are needed for inter-network and RCS EDI transfers. They are best handled on an individual basis rather than as a discrete service by an information service. The X12 committee recently disbanded a study group on internetworking.

- Control Data's now abandoned EDI clearinghouse service, called Network Transfer Service, was offered to competing EDI networks and RCS firms. The network was used only by CDC's own RediNet and by TranSettlements.

- Some EDI interviewed users feel that internetwork exchanges are required if VANs hope to provide full "universal" service to customers.

- The value-added enhancements suggested here will provide advantages to third-party EDI service providers over private EDI systems and also will serve to differentiate services.

- Exhibit V-7 summarizes these value-added EDI services.

## E. RECOMMENDATIONS

- This section provides INPUT's recommendations to EDI service market participants and users. While segmented for the primary service participants (VANs, RCS firms) and users, the recommendations to one segment may well apply to the others.

- Specific recommendations regarding EDI software and more detailed guidelines for users will be included in companion INPUT reports.

### 1. CENTRAL RECOMMENDATION: CREATE AWARENESS

- INPUT's central recommendation is linked to the finding of only moderate awareness of EDI by IS/Telecom professionals and lower awareness levels in senior management.

  - Although awareness is steadily growing, INPUT's current survey found users rating their personal knowledge of EDI at 2.6, with 5 indicating high awareness.

EXHIBIT V-7

## ENHANCED EDI SERVICES

| SERVICES | EXAMPLES | COMMENTS |
|---|---|---|
| Data Bases from EDI Traffic | Sterling Software's MEDIMETRICK (Pharmaceuticals) | Requires Trading Partner Approval; Useful for Sales Management/Forecasts |
| Graphics | GE's DESIGN*NET; VIDEOLOG; WSSDOM (AT&T, CAD CAM INC.) | Applications in Electronics, Aerospace |
| Comparison Shopping | CAPEX - Motor Carriers<br>CDLA/NET - Computers<br>AMERICAN TELEPROCESSING Computers, Rare Coins, Telecom Equipment | E-mail Typically Used for Trading and Contracts |
| Internetworking | TeleNet/IBM-IN<br>RailInc/Kleinschmidt | X12 Committee Internetworking Study Goup Disbanded |

- This indicates a need for vendors to better promote EDI as a strategically important tool, applicable to a range of industries, in improving company operations while reducing costs.

- Vendors are directing more marketing attention to EDI, providing informational programs and targeting corporate management in sales programs. However, improvements can be made through general business press articles and advertising oriented to the EDI solution.

- Industry groups should adopt an EDI graphic symbol to identify companies using EDI standards. A promotional symbol on letterhead in advertising and marketing literature will enhance corporate imagry and generate EDI awareness.

- These recommendations are shown in Exhibit V-8.

2. RECOMMENDATIONS TO VALUE-ADDED NETWORKS

a. Offer EDI and Maintain Current Customers

- There is inherently little reason for a VAN not to offer EDI services.

  - A vendor failing to provide EDI is missing an opportunity to participate in an area which addresses fundamental business needs.

  - EDI will eventually become a utility or commodity service in its own right, and a firm without an offering may lose its current customers.

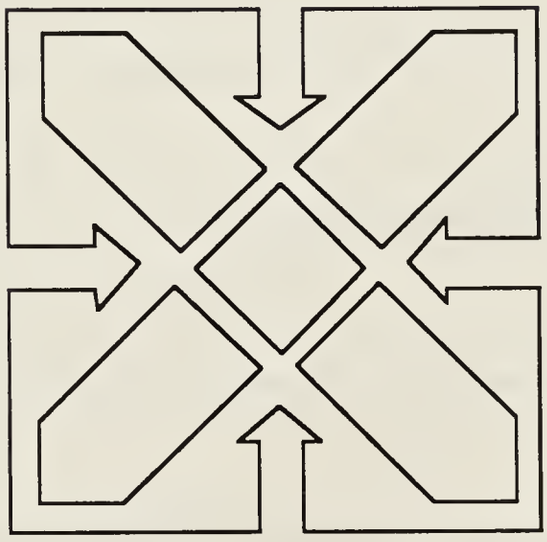
  - If EDI services are currently provided, develop strategies to maintain the current customer base through:

    . Training.

    . Technical support.

EXHIBIT V-8

## CENTRAL RECOMMENDATIONS CREATE AWARENESS



- Promote the EDI Solution
- Adopt an EDI Symbol

- Newsletters.

- VAN-sponsored industry seminars addressing common issues.

- Sponsored user groups.

- Adoption of consumer marketing tools such as bonus plans and premimums to encourage volume use.

b. Address Internal Flows, Redundant Systems, and Internetworking

- Vendors should address users' concerns that duplicate systems (paper and electronic) must be maintained to permit interchanges with paper-based partners.

- This can be accomplished in two ways:

  - Developing or using a commercially-available conversion service, issuing paper from electronic transactions and converting paper to electronic formats.

  - Using E-mail to convert electronic formats to hardcopy documents.

- Address the internal functions of large corporations to improve internal communications so that buying and selling processes can be handled electronically inside the company.

- Two avenues are worth exploring:

  - Offering internal E-mail systems with EDI translation capabilities.

  - Partnering with firms specializing in electronic forms management systems such as Moore Corporation.

- Both competition and opportunity for VANs is coming as the local exchange carriers implement local area data transport packet network services. Through interconnections with wide-area VANs, additional traffic results and new presence points are added with little capital outlay by the participating VAN.

- Although an ANSI X12 subcommittee on internetworking has been dissolved, vendors should continue to explore customer needs for interchanges between networks. This form of cooperation increases EDI's utility and ultimately benefits both users and vendors.

c. Target Your Markets

- Investigate and promote industry association activities, particularly in segments with little or no current EDI activity, and solicit requests for proposals from such associations.

  - There are several examples of EDI networks established by associations.

  - Such systems should be designed with gateways to wider participation by non-industry groups since trading generally crosses industry lines.

- Provide networking and professional services to large firms developing proprietary systems. These too should have gateways to other third-party networks and to industry association clearinghouses.

- The EDI service market can be thought of in three ways:

  - Third-party services accessed through a public data network. Examples include GE's EDI*Express and MDC's EDI*Net.

- Industry association EDI networks managed by the association. Examples include Transnet.

- Private systems managed by a corporation for its trading cluster, or perhaps managed by a facilities management contractor. Examples include GM's network.

- Exhibit V-9 illustrates how the three forms of EDI can be interconnected.

- Provide networking to large users insisting on private EDI implementations. Your proposal should include provisions for open access by trading partners via a no log-in service (such as MDC's) and gateways to other networks, if needed.

- Focus on markets in which you have expertise or hire and train marketing and sales personnel from industries being targeted for EDI services.

  - Exercise caution in this later approach, particularly if EDI services are a new offering.

  - It is difficult enough to develop new services without the burden of learning a new market.

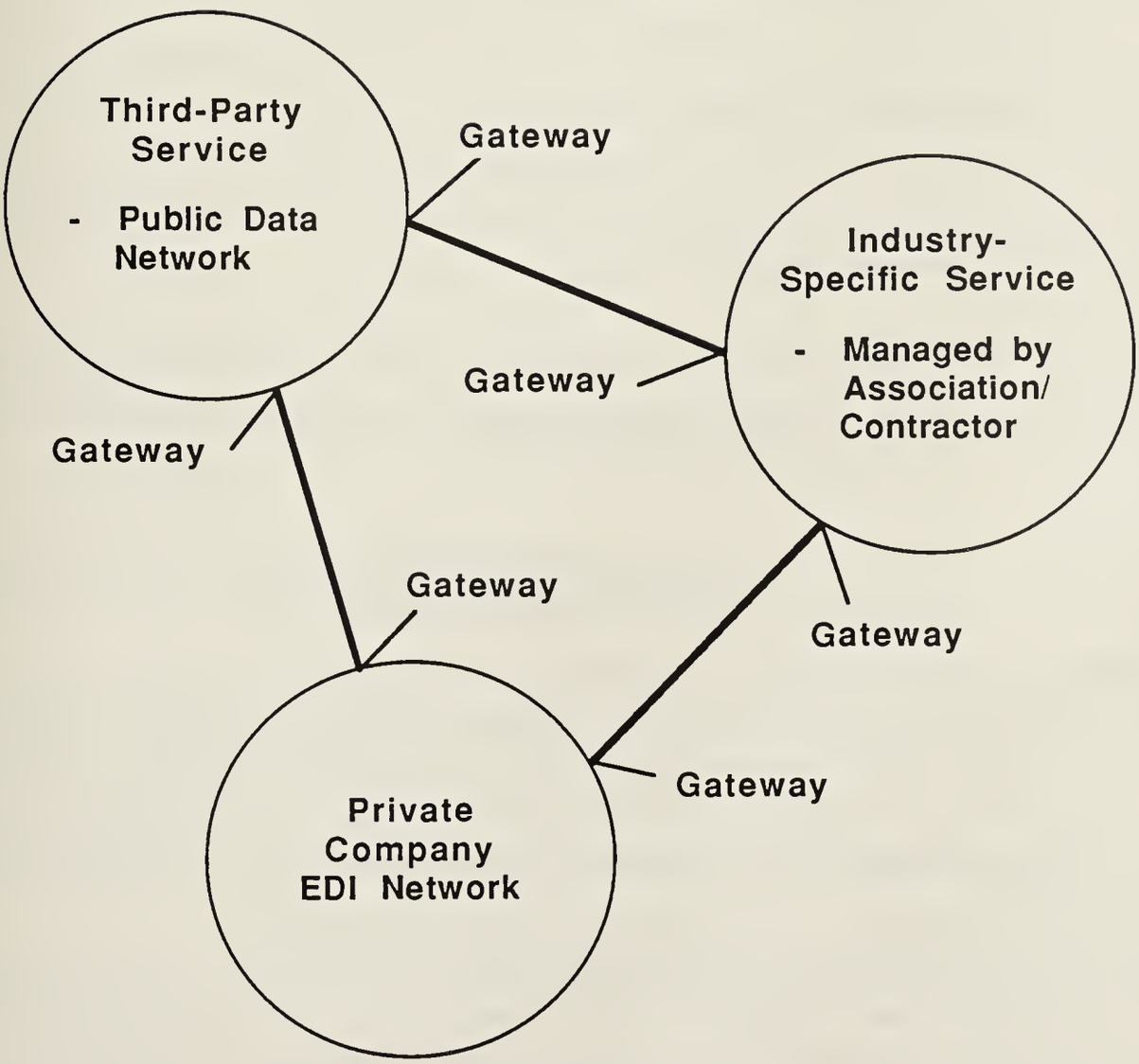
- Options for consideration are developing industry-specific EDI services for later sale to another vendor with more compatible offerings or working through specialized vertical industry information service firms to develop market segments.

- The "agent" approach used by GEISCO for EDI services is worth emulating.

  - By linking its communications services to the expertise of other qualified processing, messaging, turnkey, or software vendors, a VAN can efficiently expand its market presence.

EXHIBIT V-9

## THREE TYPES OF EDI NETWORKS



- Of course, it is important to verify that the relationship with chosen agents is within the corporate mission and will help meet stated goals.

- Target marketing efforts to corporate managers responsible for purchasing, manufacturing, and logistics as well as end-user department managers, IS managers, financial officers, and corporate presidents. This usually means consultative selling to the EDI task force.

d. Migrate E-mail Users to EDI

- Position E-mail and scripted/prompted messaging services for low-volume users in an EDI simulation.

  - This will help to capture and eventually migrate users to EDI as volume becomes greater.

  - System accounting should be used to flag high-volume E-mail users to assist marketing departments in identifying specific customers requiring an EDI solution.

  - Mixed mode E-mail may also be used to overcome some user's needs to maintain, at added cost, duplicate systems.

- Standardize on X12 and plan a migration strategy for any industry-specific or private formats now being used by your targeted industries. The service providers maintaining industry-specific formats (i.e., Ordernet's format for drug wholesalers) and the industry associations are moving in this direction.

- Consider unconventional pricing schemes such as flat rates tied to transaction volume levels instead of measured connect time or character transmissions. Users, particularly smaller ones, are often confused by a complicated pricing formula and may welcome per transaction pricing without "hidden" connect time or translation service fees.

e. Enhance EDI Services

- Provide gateways to industry-specific data bases as a value-added service. Examples include market information and tariff/shipping services.

- Use EDI network traffic to create a unique data base.

  - Vendors active in EDI services would be well served to secure control over the source data that is transmitted over the networks.

  - The financial and marketing leverage in providing on-line date bases is greatest for the data owner.

- Evaluate user's needs for graphics in association with EDI services and comparative shopping services.

- Provide detailed EDI billing and make available various summary management reports.

f. Plan International EDI Activities

- Value-added networks should enhance their services, not only domestically but internationally, particularly in countries which are developing communication infrastructures and value-added networks.

  - International activities extend the life cycles of existing technologies and position vendors for improving the international capabilities and use of their networks, EDI (and other) applications, and data bases.

  - Although few interviewed by INPUT require international EDI, as companies increasingly rely on offshore sourcing and expand their markets, international electronic business transactions will gain importance.

- International trading has some characteristics which make it particularly well suited for EDI.

  - International trade documents are more complex than those used domestically.

  - Document errors can cause expensive delays in shipment, compounded by the distances involved, language barriers, and government regulations.

- The costs of international documentation is estimated at $8 billion annually. The National Committee on International Trade Documentation (NCITD) is dedicated to simplifying international trade paperwork by 50%, in part through the use of electronic communications.

- Several third-party EDI vendors are already active in international EDI, and additional participation is expected.

  - However, most international EDI activity is oriented toward Europe due to the similarity of standards and interests and a comparable (though not equivalent) level of computerization.

  - INPUT anticipates more activity in other areas, most notably the Pacific Rim.

- EDI within Western Europe is the subject of a separate INPUT study, and International EDI will be examined in a forthcoming report.

- INPUT's recommendations to VANs are summarized in Exhibit V-10.

EXHIBIT V-10

## EDI RECOMMENDATIONS: VANS

- Provide/Support EDI
- Address
  - Internal Processes
  - Redundancy
  - Internetworking
- Target Markets
  - Associations
  - Private Systems
  - Corporate Managers
- Partner:
  - EDI Agents
  - Messaging, Turnkey, Software Vendors
- Enhance EDI Services

## 3. RECOMMENDATIONS TO REMOTE COMPUTER SERVICES

### a. Focus Your Marketing

- Evalute the need for and interest in EDI by the industries now using your services. A strong customer knowledge base can be invaluable and is best acquired by focusing resources on a small number of market segments.

- Establish or strengthen local- or industry-focused sales and support offices to improve customer response time.

- Investigate the feasibility of selling micro-based turnkey systems and supporting smaller, uncomputerized trading partners in specific industries. Realistically evaluate your ability to provide service and support.

### b. Be Efficient in Service Development

- If current resources prohibit cost-effective internal development, license EDI software from others. Opportunities may be lost if in-house development slows entry into a rapidly developing market.

- Provide or arrange for customization services to adapt on-line order entry and inventory systems to accept batch entry (required for full EDI implementation) and to handle translations from company-specific data formats to industry standard formats.

### c. Look to Partnering Opportunities

- Investigate expansion of marketing and distribution channels through joint ventures with turnkey systems and software companies. Partnering will enable quick and economical development and marketing of services to reach potential customers.

- Seek partnering with network service vendors, including but not limited to BOCs, to improve your marketing profile and networking capabilities. The BOCs are very interested in transaction and other information services opportunities as regulations are removed.

- Cultivate consultants who are becoming more important as IS markets and technologies grow in complexity.

- INPUT's recommendations to RCS vendors are shown in Exhibit V-11.

4. RECOMMENDATIONS TO USERS

a. Sell EDI Internally

- Form an EDI task force with broad company representation to work across departmental lines and to avoid internal jurisdictional problems.

- Educate corporate management on the benefits of EDI to encourage resource allocation for its development. Use every appropriate means--distribute articles about competitors and EDI in general (including INPUT's EDI Reporter newsletter), send E-mail messages, and conduct informational presentations.

b. Think Twice about Proprietary EDI

- It may be advantageous for large companies to continue developing closed EDI systems.

  - Such systems work to maintain the customer base and provide a competitive edge.

  - There is a lower chance of security breaches. A company-controlled system is more secure than one operated by a third party.

EXHIBIT V-11

## EDI RECOMMENDATIONS: RCS

- Focus/Strengthen Marketing
- Develop EDI Efficiently
- Partner
  - Joint Venture
  - BOCS
  - Consultants

- Such systems will shift some of the internal customer service burden to customers.

- The resulting savings will defer development costs and help maintain competitive prices on goods and services.

- However, unless developed with attention to future needs, proprietary networks may later prove burdensome to enhance.

  - The pressures to meet internal needs may detract attention from standards which add another level of complexity to system implementation.

  - INPUT recommends that proprietary EDI systems use X12 standards, and that users/developers monitor standard refinements to maintain compatibility.

  - Most inter-company communications are not confined to a specific industry.

  - Keeping expansion options open through standards compliance offers a flexibility safeguard.

  - A hybrid system with gateways to third-party services is the best option for otherwise private EDI systems.

- Managing a proprietary EDI network requires a resource commitment for both implementation and management. Carefully evaluate your abilities before implementation, and use a third-party service if there is any question about company support.

c. Support and Encourage Your Users

- Developers should solicit feedback from system users, implementing changes recommended. Otherwise, an inflexibile system will create frustration and may not be used.

- Consider the advantages of providing suppliers and major customers with micro-based EDI terminals and software, on a no-cost or at cost basis, and the advantages of sharing personnel resources for EDI systems development to encourage EDI acceptance and reduce costs.

- Industry dominant companies should consider requiring their suppliers to use EDI as a business condition.

  - Partners not conforming to standards or using manual systems might be levied a surcharge to cover the additional costs involved.

  - While this may not be advisable in companies dependent on uncomputerized suppliers, with proper marketing, EDI's benefits will be recognized.

d. Stage Your Development and Get Help if Needed

- An EDI development strategy should be based on migrating from or upgrading existing management information or on-line order entry systems to provide remote, on-line ordering, order inquiries, and electronic messaging with principal customers, later adding functions and other partners.

- Guidance in implementation, programming, transaction sets, data elements definitions, and communications standards is available from the TDCC/EDIA, industry associations, and professional services firms.

- Recommendations for users are summarized in Exhibit V-12.

EXHIBIT V-12

## EDI RECOMMENDATIONS: USERS

- Sell Internally:
  - Task Force
  - Corporate Management
- Rethink Closed Systems
- Support/Encourage Users and Partners
- Stage Development
- Get Help if Needed

## F. CONCLUDING REMARKS

- EDI will eventually impact file transfer applications, E-mail, facsimile, and the U.S. Postal Service.

- EDI shows every indication of being poised for explosive growth. Accordingly, companies with EDI products and services are assuming positions to capitalize on growing demands.

- In this competitive marketplace, poorly planned enterprises will suffer the consequences of their deficient actions, while those with foresight and strategic planning investments will gain substantial benefits.

# APPENDIX A: EDI TERMS DEFINED

## APPENDIX A: EDI TERMS DEFINED

- ACH - Automated ClearingHouse. A banking industry mechanism for electronic funds transfer (also see NACHA).

- AIAG - The Automotive Industry Action Group. A trade association. Also refers to EDI formats developed by the association.

- ANSI - American National Standards Institute.

- ASC - Accredited Standards Committee.

- Bar Coding - A standardized method of identifying products which facilitates data entry through scanning of coded printed labels.

- Batch Processing - A data processing/data communications method which groups transactions. Compare to real-time processing.

- CAD/CAM - Computer Assisted Design and Computer Assisted Manufacturing. A set of applications which use graphics to manage these functions.

- CARDIS - Cargo Data Information System. A program of the National Council on International Trade Documentation.

- CCD - Cash Concentration and Dispursement. An electronic funds tranfer format.

- CIDX - Chemical Industry Data Exchange. Based on ASC X.12.

- CLM - Car Location Messages, applied to rail car logistics.

- Compliance Checking - A function which verifies that document information is received in the right order and in the proper format.

- COPAS - Council of Petroleum Accounting Standards. An industry association developing EDI standards.

- CSI - Commercial Systems Integration. A professional service whereby vendors take complete responsibility for designing, planning, implementing, and sometimes managing a complex information system.

- CTP - Corporate Trade Payments. An electronic funds transfer application.

- CTX - An electronic funds transfer mechanism which is compatible with the EDI X12 standard and which carries information about a payment as well as transferring value.

- ECS - Electronic Claims Submissions. Insurance claims are automatically generated and electronically sent to insurance companies.

- EDI - Electronic Data Interchange. The computer-to-computer communications based on established business document standards or using translations by EDI software housed on users' computers located at remote computer service bureaus or on value-added network processors.

- EDX - Electronics Industry Data Exchange. Based on ASC X.12.

- EFT - Electronic Funds Transfer. The transfer of value.

- Electronic Mail - The transmission of text, data, audio, or image messages between terminals using electronic communications channels.

- Electronic Mailbox - A store and forward facility for messages maintained by a transmission or processing facility.

- GTDI - General Trade Data Interchange. An international standard developed from TDI accommodating compromises of French participants in SITPRO, the agency behind U.N. certification of the standard.

- HCFA - Health Care Financing Administration. A U.S. government agency responsible for Medicare administration. Also describes a format for health care insurance claims.

- ICOPS - The Industry Committee on Office Products Standards. Sponsored by two office products trade associations for EDI applications.

- IRC - International Record Carrier. A common carrier providing messaging and network services, no longer limited to international communications.

- IVANS - Insurance Value Added Service. Provided on IBM's Information Network by an insurance industry association.

- JEDI - The Joint Electronic Data Interchange Committee, consisting of representatives of industry trade associations coordinating development of a reference EDI dictionary for the creation of new EDI transactions, segments, or data elements.

- JIT - Just-In-Time. An inventory management philosophy which plans delivery of needed materials and components immediately prior to final manufacture or assembly.

- LDI - Logistics Data Interchange. Information about the location of materials in transit through the manufacturing/distribution cycle.

- Ordernet - Sterling Software's EDI service. Also refers to EDI standards developed by the National Wholesale Druggist's Association for use in pharmaceuticals.

- NACHA - National Automated Clearing House Association. A banking services industry group.

- Real-Time - A data processing or transmission method with data entered interactively. Response to input is fast enough to affect subsequent input. The results are used to influence a currently occurring process.

- RCS - Remote Computing Service. A facility which arranges to process some or all of a user's workload. Similiar to a VAN (see below) but without network services.

- SAM - Shippers Administrative Messages. A logistics service/application.

- SITPRO - Simplification of Information Trade Procedures. Refers to European/international EDI standards approved by the United Nations.

- Store and Forward - The capability of a transmission or processing facility to hold messages or data until requested or until a prescheduled time.

- SUPER - Study for the Utility of Processing Electronic Returns. An Internal Revenue Service test for electronic filing.

- SUPERB - The IRS' electronic filing test program for business returns.

- TALC - Textile/Apparel Linkage Council. A subcommittee addressing EDI standards.

- TAMCS - Textile/Apparel Manufactuer's Communications Standards.

- TDCC - The Transportation Data Coordinating Committee. An early advocate for EDI. Also refers to U.S. EDI standards.

- TDI - Trade Data Interchange. An international shipping standard (also see GTDI).

- Translation - Transforming information sent in one format to another format.

- UB82 - A format for health claims insurance submissions.

- UCS - Uniform Communications Standards. The EDI standards used by the grocery industry, based on X.12 and coordinated by the Uniform Product Code Council.

- VAN - Value Added Network. A common carrier network transmission facility, usually augmented with computerized packetizing which may also provide store and forward switching, terminal interfacing, and error detection and correction and host computer interfaces supporting various communications speeds, protocols, and processing requirements.

- VICS - Voluntary Inter-Industry Communications Standards. A committee developing EDI standards between retailers and manufacturers.

- WINS - Warehouse Information Network Standards. Promoted by two representational associations--the International Association of Refrigerated Warehouses and the American Warehousemen's Association.

- X12 - A set of generic EDI standards approved by the American Standards Committee.

- X.400 - An international electronic mail standard.

# APPENDIX B: QUESTIONNAIRE

EDI User STARTER Questionnaire

Hello, I'm _____ calling from INPUT, a Mountain View, California research firm. We're doing a series of studies on data communications between companies.

I would like to ask you about your activities, your plans and awareness of this field. The interview will take approximately 20 minutes, and I think you'll find it interesting. Your comments will be reported in aggregate and you will not be identified in our report. In exchange for your help, we will send you a summary of our findings for your files.

Is now a good time?

The first set of questions involves your awareness and level of activity in Electronic Data Interchange or EDI. We define EDI as exchanging electronic purchase orders, invoices and other routine business documents, directly between computers, or through a third party. It is related to, but different from, an online order entry system which your customers may log onto from their terminal to buy products from you.

1. On a scale of 1-5, with five being high awareness, how would you RATE YOUR PERSONAL KNOWLEDGE OF EDI, not so much from a technical standpoint, but from a strategic standpoint, that is, what EDI "does"? 1 2 3 4 5

2. How would you describe your company's involvement in EDI?

(a)___**JUST BEGINNING** to look at it [GO TO QUESTIONNAIRE "A"]

(b)___**ACTIVELY PLANNING** an EDI project [GO TO QUESTIONNAIRE "A"]

(c)___**IMPLEMENTING** an EDI project [GO TO QUESTIONNAIRE "B"]

(d)___**CURRENTLY USING** EDI or if you [GO TO QUESTIONNAIRE "B"]

(e)___Have **NO CURRENT PLANS** to use it. [GO TO QUESTIONNAIRE "C"]

BEGINNING/PLANNING EDI QUESTIONNAIRE

3. Who would be responsible for your EDI PLANNING activity.
(a)___The Information Services Department (b) ___a functional dept. (c) ___a committee (d)___ d/k (e)___other specify:_____

BACKGROUND

4. Can you ESTIMATE WHEN YOU MIGHT ACTUALLY START IMPLEMENTING EDI?

(a)___this year (b) ___next year (1988) (c) ____in 3-5 years
(d)___no current plans

5. (a) On the scale of 1-5, with 5 being "highly likely", HOW LIKELY would it be that you would CONTRACT with a THIRD PARTY to help implement your EDI system? 1 2 3 4 5

(b) How would you rate the likelihood that you would implement the system TOTALLY YOURSELF? 1 2 3 4 5

(c) Assuming you were to use a third party for some help in implementing EDI, would that third party likely be:
[READ OPTIONS:]
(i) ___An independent consultant

(ii) ___ A professional services firm

(iii) ___An industry association:_____

(iv) ___A communications company, such as a value added network

(v) ___A Remote Computing Service

(vi) ___A financial services organization

COMMUNICATIONS & HARDWARE ENVIRONMENT

EDI is different from an on-line order entry system. Typically, in an on-line order entry system, your staff or your customers use terminals to interactively input orders or query the system. It does not accept machine readable data from another computer.

6. a. Does your company have any sort of ON-LINE ORDER ENTRY SYSTEM now? Y/N

b. [IF YES] Is it USED DIRECTLY BY YOUR CUSTOMERS? Y/N

c. [IF YES] Could you please DESCRIBE it.

d. [IF YES] Are there any PLANS TO ENHANCE YOUR ONLINE ORDER ENTRY SYSTEM to become an EDI system. Y/N If yes, when?

(i) ___this year (ii) _____next year (iii) ____within three years (iv) ___no plans/dk

e. (IF **NO ORDER ENTRY SYSTEM**) Are you planning any type of system like this? Y/N

7. (a) Could you please tell me what Value Added Networks (VANs) OR remote computing service (RCS) your company uses or plans to use.

_____ Will they be used for EDI? Y/N

_____ Will they be used for EDI? Y/N

8. (a) To your knowledge, are you USING ANY FORM OF ELECTRONIC MAIL, including telex or facsimile, TO TRANSFER PURCHASE ORDERS OR INVOICES TO TRADING PARTNERS? Y/N

(b) [IF YES] Is this ___computer electronic mail, ___telex or ___facsimile?

(c) [IF YES] Could you estimate the percentage of your transactions which are sent out this way? _____%

9. What HARDWARE do you anticipate using for EDI? Will it be a (a) micro, a (b) mini or a (c) mainframe?

Comments:_____

SOFTWARE

10. (a) Do you plan to WRITE THE EDI SOFTWARE yourself, will you PURCHASE it, or will you BUY a package THEN CUSTOMIZE it?
___(i)WRITE ____(ii)PURCHASE ___(iii)BUY AND CUSTOMIZE

b. Why will you take this approach?

c. What vendors are you looking at?

d. Could we rate the importance of software features? On our scale of 1-5, with 5 being very important, how important is it for EDI software to:

| | | |
|---|---|---|
| (i) | BE INTEGRATED with other business applications such as accounting, inventory, etc. | 1 2 3 4 5 |
| (ii) | Support GRAPHICS | 1 2 3 4 5 |
| (iii) | Be EASILY USED by non-computer users | 1 2 3 4 5 |
| (iv) | Be Usable with LIGHTPENS | 1 2 3 4 5 |
| (v) | Have ENCRYPTION capabilities | 1 2 3 4 5 |
| (vi) | Be EASILY UPGRADED to new standards | 1 2 3 4 5 |
| (vii) | ACKNOWLEDGE successful transmission | 1 2 3 4 5 |
| (viii) | Report EXCEPTIONS clearly | 1 2 3 4 5 |
| (ix) | Have a MAINTENANCE AGREEMENT for updates/fixes | 1 2 3 4 5 |

11. With regard to INTEGRATING EDI SOFTWARE with other applications such as accounting, or purchasing, which is more preferable:

___(a) To integrate the EDI software with your other applications yourself.

___(b) To hire a consultant or professional services firm to integrate the EDI software with your other applications, OR

___(c) To buy new software for accounting, inventory, etc. with built-in EDI functionality.

12. What transactions are you planning to do via EDI, and in what time frame?

| type of document | time frame 1987 | 1988 | 3yrs | d/k |
|---|---|---|---|---|
| (a)__Purchase Orders FROM customers | ___ | ___ | ___ | ___ |
| (b)__Purchase Orders TO suppliers | ___ | ___ | ___ | ___ |
| (c)__Bills of Lading | ___ | ___ | ___ | ___ |
| (d)__Invoices | ___ | ___ | ___ | ___ |
| (e)__Payments | ___ | ___ | ___ | ___ |
| (f) Others_____ | ___ | ___ | ___ | ___ |
| _____ | ___ | ___ | ___ | ___ |

13. Have you done any cost analysis, on a per-transaction basis, of your PAPER BASED systems for purchase order processing, invoicing or other routine paperwork of this nature? (If yes: What did you find out?)

14. With approximately how many other companies do you exchange ANY TRANSACTIONS?(a)1-5
(b)6-10
(c)11-20
(d)21-30
(e)31-40
(f)41-50
(g)50+ how many:_____

THIS FINAL PART OF THE SURVEY DEALS WITH EDI ISSUES AND CONCERNS. DO YOU HAVE JUST A FEW MORE MOMENTS?

ISSUES

15. Let me read you a list of issues and problems which we believe people may be concerned about, and ask you for a rating, again on a 1-5 scale, with "5" being "a serious concern" and 1 being "not a serious concern" and get your reaction:

How much of a concern are:

| | | | | | |
|---|---|---|---|---|---|
| (a)The actions of your COMPETITORS with regards to EDI | 1 | 2 | 3 | 4 | 5 |
| (b)Concerns about the ENTIRE SYSTEM including hardware and software which you may install | 1 | 2 | 3 | 4 | 5 |
| (c)Network/Data SECURITY | 1 | 2 | 3 | 4 | 5 |
| (d)Software MAINTENANCE | 1 | 2 | 3 | 4 | 5 |
| (e)INTERNATIONAL EDI capabilities, that is, the ability to do business with people in other countries | 1 | 2 | 3 | 4 | 5 |
| (e.i.) Are you doing any international trading now? | | Y/N | | | |
| (f)Changing BUSINESS PRACTICES, for example managing the change from paper forms to electronic forms | 1 | 2 | 3 | 4 | 5 |
| (g)RELIANCE on ONE VENDOR or Service | 1 | 2 | 3 | 4 | 5 |
| (h)VENDOR VIABILITY | 1 | 2 | 3 | 4 | 5 |
| (i)EDI STANDARDS and COMPATIBILITY | 1 | 2 | 3 | 4 | 5 |
| (j)OTHER CONCERNS?_____ | 1 | 2 | 3 | 4 | 5 |
| (k)_____ | 1 | 2 | 3 | 4 | 5 |

THAT CONCLUDES OUR FORMAL INTERVIEW. Is there anything else you think we should consider in our report on electronic data interchange? Are there any collegues at other companies we might call? Name_____ phone:_____

Thank you very much for your help. Your comments are appreciated, and will help make our report most informative and valuable. We should have the executive summary out to you within 6-8 weeks. Can I verify your address and a little about your company? [[INTERVIEWER: COMPLETE COVER PAGE REGARDING SALES REVENUES, NUMBER OF EMPLOYEES AND INDUSTRY SECTOR.]

Thanks again.

INTERVIEWER: PLEASE EVALUATE THIS RESPONDENT:

(a)_____very helpful (b)____somewhat helpful (c)___not helpful

IMPLEMENTORS/USING EDI QUESTIONNAIRE

3. Is/Was your EDI IMPLEMENTATION MANAGED BY THE FUNCTIONAL DEPARTMENT, or did INFORMATION SERVICES (IS) MANAGE its implementation? (a)___IS (b) ___functional dept.
(c)___committee (d)___ d/k (e)___other answer:_____
_____

BACKGROUND

4. Can you tell me WHEN YOU STARTED IMPLEMENTING EDI?

(a)___this year (b) ___LAST year (1986) (c) ____ 1985
(d)___1984 or earlier

5. How did you go about IMPLEMENTING EDI? Did you:

___(a) Contract with a THIRD PARTY to help implement your EDI system? (IF YES ASK:) Why did you take this approach?

___(b.) Did you implement the system TOTALLY YOURSELF? (IF YES ASK:) **Why?** [THEN SKIP QUESTION c.]

c. Since you used a third party to help you implement EDI, was that third party: [READ OPTIONS]

(i) ___An independent consultant

(ii) ___A professional services firm

(iii) ___An industry association:_____

(iv) ___A communications company, such as a value added network

(v) ___A Remote Computing Service

(vi) ___A financial services organization

COMMUNICATIONS & HARDWARE ENVIRONMENT

EDI is different from an on-line order entry system. Typically, in an on-line order entry system, your staff or your customers use terminals to interactively input orders or query the system. It does not accept machine readable data from another computer.

6. Did your company have any sort of ON-LINE ORDER ENTRY SYSTEM before it had EDI THAT WAS ENHANCED to become the EDI system? Y/N
Comments: _____
_____
_____

7. Could you please tell me what Value Added Networks (VANs) OR remote computing service (RCS) your company uses for EDI?

_____

_____

8. (a) To your knowledge, were you (or are you still) using any form of electronic mail, including telex or facsimile, TO TRANSFER PURCHASE ORDERS OR INVOICES TO TRADING PARTNERS? Y/N

(b) [IF YES] Is this ___computer electronic mail, ___telex or ___facsimile?

(c) [IF YES] Could you estimate the percentage of your transactions which are [still] sent out this way? _____%

9. What HARDWARE are you using for EDI? Is it a (a) micro, a (b) mini or a (c) mainframe?

Comments: _____
_____

SOFTWARE

10. (a) Did you WRITE THE EDI SOFTWARE youself, did you PURCHASE it, OR did you BUY A PACKAGE AND CUSTOMIZE IT?
___(i)WRITE ___(ii)PURCHASE ___(iii)BUY AND CUSTOMIZE

b. Why did you take this approach?

c. If you purchased software, what vendor did you choose? Why?

d. Could we rate the importance of software features? On a scale of 1-5, with 5 being very important, how important is it for EDI software to:

| | | |
|---|---|---|
| (i) | BE INTEGRATED with other business applications such as accounting, inventory, etc. | 1 2 3 4 5 |
| (ii) | Support GRAPHICS | 1 2 3 4 5 |
| (iii) | Be EASILY USED by non-computer users | 1 2 3 4 5 |
| (iv) | Be Usable with LIGHTPENS | 1 2 3 4 5 |
| (v) | Have ENCRYPTION capabilities | 1 2 3 4 5 |
| (vi) | Be EASILY UPGRADED to new standards | 1 2 3 4 5 |
| (vii) | ACKNOWLEDGE successful transmission | 1 2 3 4 5 |
| (viii) | Report EXCEPTIONS clearly | 1 2 3 4 5 |
| (ix) | Have a MAINTENANCE AGREEMENT for updates/fixes | 1 2 3 4 5 |

11. With regard to INTEGRATING EDI SOFTWARE with other applications such as accounting, or purchasing, which is more preferable:

___(a) To integrate the EDI software with your other applications YOURSELF.

___(b) To hire a CONSULTANT OR PROFESSIONAL SERVICES firm to integrate the EDI software with your other applications, OR

___(c) To buy NEW SOFTWARE for accounting, inventory, etc. with built-in EDI functionality.

d. DO YOU HAVE ANY COMMENT ON HOW LONG IT TOOK YOU TO INTEGRATE YOUR SOFTWARE, OR ON THE COSTS ASSOCIATED WITH THE PROJECT?

12. What transactions are you now doing, and which do you plan to do via EDI, and in what time frame?

| type of document | time frame now | 1988 | 3yrs | d/k |
|---|---|---|---|---|
| (a)__Purchase Orders FROM customers | ___ | ___ | ___ | ___ |
| (b)__Purchase Orders TO suppliers | ___ | ___ | ___ | ___ |
| (c)__Bills of Lading | ___ | ___ | ___ | ___ |
| (d)__Invoices | ___ | ___ | ___ | ___ |
| (e)__Payments | ___ | ___ | ___ | ___ |
| (f) Others_____ | ___ | ___ | ___ | ___ |
| _____ | ___ | ___ | ___ | ___ |

(numbering off)

14. Could you estimate the GROWTH IN THE NUMBER OF EDI TRANSACTIONS, first between the end of 1985 and the end of 1986? ____%

15. And how about your EDI EXPECTATIONS FOR THIS YEAR... what percentage of growth in transactions would you estimate?____%

comments:_____

_____

16. Have you done any cost analysis, on a per-transaction basis, of your PAPER BASED systems for purchase order processing, invoicing or other routine paperwork of this nature? (If yes: What did you find out?)

17. Have you done any analysis of the cost, on a per transaction basis, of any EDI transactions? (If YES: What did you find out?)

18. With approximately how many other companies do you exchange

ANY TRANSACTIONS?
(a)1-5
(b)6-10
(c)11-20
(d)21-30
(e)31-40
(f)41-50
(g)50+ how many:_____

EDI TRANSACTIONS:
(a)1-5
(b)6-10
(c)11-20
(d)21-30
(e)31-40
(f)41-50
(g)50+ how many:_____

ISSUES

THIS FINAL PART OF THE SURVEY DEALS WITH EDI ISSUES AND CONCERNS. DO YOU HAVE JUST A FEW MORE MOMENTS?

15. Let me read you a list of issues and problems which we believe people may be concerned about, and ask you for a rating, again on a 1-5 scale, with "5" being "a serious concern" and 1 being "not a serious concern" and get your reaction:

How much of a concern are:

| | | | | | |
|---|---|---|---|---|---|
| (a)The actions of your COMPETITORS with regards to EDI | 1 | 2 | 3 | 4 | 5 |
| (b)Concerns about the ENTIRE SYSTEM including hardware and software which you may install | 1 | 2 | 3 | 4 | 5 |
| (c)Network/Data SECURITY | 1 | 2 | 3 | 4 | 5 |
| (d)Software MAINTENANCE | 1 | 2 | 3 | 4 | 5 |
| (e)INTERNATIONAL EDI capabilities, that is, the ability to do business with people in other countries | 1 | 2 | 3 | 4 | 5 |
| (e.i.) Are you doing any international trading now? | | Y/N | | | |
| (f)Changing BUSINESS PRACTICES, for example managing the change from paper forms to electronic forms | 1 | 2 | 3 | 4 | 5 |
| (g)RELIANCE on ONE VENDOR or Service | 1 | 2 | 3 | 4 | 5 |
| (h)VENDOR VIABILITY | 1 | 2 | 3 | 4 | 5 |
| (i)EDI STANDARDS and COMPATIBILITY | 1 | 2 | 3 | 4 | 5 |
| (j)OTHER CONCERNS?_____ | 1 | 2 | 3 | 4 | 5 |

(k)_____ 1 2 3 4 5

THAT CONCLUDES OUR FORMAL INTERVIEW. Is there anything else you think we should consider in our report on electronic data interchange? Are there any collegues at other companies we might call? Name_____ phone:_____

Thank you very much for your help. Your comments are appreciated, and will help make our report most informative and valuable. We should have the executive summary out to you within 6-8 weeks. Can I verify your address and a little about your company? [[INTERVIEWER: COMPLETE COVER PAGE REGARDING SALES REVENUES, NUMBER OF EMPLOYEES AND INDUSTRY SECTOR.]

Thanks again.

INTERVIEWER: PLEASE EVALUATE THIS RESPONDENT:

(a)_____very helpful (b)____somewhat helpful (c)___not helpful

QUESTIONNAIRE "C"

NO PLANS FOR EDI QUESTIONNAIRE

EVEN THOUGH YOU ARE NOT CURRENTLY PLANNING TO IMPLEMENT EDI, WE WOULD APPRECIATE IT IF YOU COULD ANSWER SOME QUESTIONS ON YOUR COMMUNICATIONS ENVIRONMENT AND ON SOME GENERAL EDI ISSUES.

COMMUNICATIONS ENVIRONMENT

We mentioned that EDI is different from an on-line order entry system. Typically, in an on-line order entry system, your staff or your customers use terminals to interactively input orders or query the system. It does not accept machine readable data from another computer.

3. a. Does your company have any sort of ON-LINE ORDER ENTRY SYSTEM now? Y/N

b. (If NO ask:) Are you PLANNING any type of system like this? Y/N

c. (If YES ask:) Could you please DESCRIBE it.

d. (If YES ask:) Might there be PLANS TO ENHANCE your online order entry system TO BECOME AN EDI SYSTEM. Y/N If yes, when?

(i) ___this year (ii) _____next year (iii) ____within three years (iv) ___no plans/dk

4. Could you please tell me what Value Added Networks (VANs) OR remote computing service (RCS) your company uses for ANY REASON?

_____ _____ _____

5.(a) To your knowledge, are you USING ANY FORM OF ELECTRONIC MAIL, including telex or facsimile, TO TRANSFER PURCHASE ORDERS OR INVOICES TO TRADING PARTNERS? Y/N

(b) [IF YES] Is this ___computer electronic mail, ___telex or ___facsimile?

(c) [IF YES] Could you estimate the percentage of your transactions which are sent out this way? _____%

4. With approximately how many other companies do you exchange transactions in your buying and selling relationships?

(a)1-5

(b)6-10

(c)11-20

(d)21-30

(e)31-40

(f)41-50

(g)50+ how many:_____

ISSUES

7. Let me read you a list of issues people may be concerned about when Interchange, and ask you for a rati being "a serious concern" and 1 bei get your reaction:

How much of a concern are:

| | |
|---|---|
| (a)The actions of your COMPETITORS with regards to EDI | 1 |
| (b)Concerns about the ENTIRE SYSTEM including hardware and software which you may install | 1 |
| (c)Network/Data SECURITY | 1 |
| (d)Software MAINTENANCE | 1 |
| (e)INTERNATIONAL EDI capabilities, that is, the ability to do business with people in other countries (e.i.) Are you doing any international trading now? | 1 |
| (f)Changing BUSINESS PRACTICES, for example managing the change from paper forms to electronic forms | 1 |
| (g)RELIANCE on ONE VENDOR or Service | 1 |
| (h)VENDOR VIABILITY | 1 |
| (i)EDI STANDARDS and COMPATIBILITY | 1 |
| (j)OTHER CONCERNS?_____ | 1 |
| (k)_____ | 1 |

THAT CONCLUDES OUR FORMAL INTERVIEW. Is there anything else you think we should consider in our report on electronic data interchange? Are there any collegues at other companies we might call? Name_____ phone:_____

Thank you very much for your help. Your comments are appreciated, and will help make our report most informative and valuable. We should have the executive summary out to you within 6-8 weeks. Can I verify your address and a little about your company? [[INTERVIEWER: COMPLETE COVER PAGE REGARDING SALES REVENUES, NUMBER OF EMPLOYEES AND INDUSTRY SECTOR.]

Thanks again.

INTERVIEWER: PLEASE EVALUATE THIS RESPONDENT:

(a)_____very helpful (b)____somewhat helpful (c)___not helpful